

Epistemics of the Virtual

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by Johan F. Hoorn

Epistemics of the Virtual

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Introduction

If we look at the history of multimedia, from the firelight projection shows in China (3000 BC) to the video-projection goggles of today, over the years the speed of inventing new media has increased astoundingly and penetrated nearly all walks of life. As society has become more 'mediated,' we should be concerned with how we understand and deal with the host of virtual creatures, communities, messages, and services we encounter. With the development of graphic engines that are capable of generating hyperrealistic imagery, the distinction between what is 'fake' and what is 'fact' is put under pressure. That does not mean, however, that only mediated communication has virtual elements. Non-mediated, face-to-face communication such as conversations, interviews, and interrogations also can have their fictitious side. People lie, boast, or try to convey a positive self-image.

Being surrounded by multimedia and virtual worlds sometimes may be confusing; yet, talking and thinking about it may be even more so. The terminology that is used for the description of experiences in the virtual world is not well-defined yet. It is a young area that makes use of concepts created for older media such as books and films, which are non-interactive. The newly developed terms such as 'immersion' and 'transportation' are so much under debate that their meanings change while research progresses. This is not wrong or something to be avoided – this book also will redefine many of the older terms (i.e. the concept of 'fiction') but it would be helpful if we could come up with a framework that shows how the various concepts fit together.

There is also an upside to things. Fiction takes place in such a diffuse problem space that it leaves a lot of room for creativity to transpire. If humanity wants to adapt to changing situations and not keep on repeating itself, unclarity is even a prerequisite to come to a genuine innovation. In fact, in Hoorn (in prep.) I will argue that in well-defined and clear problem spaces, opportunities for creative solutions will hardly occur.

This book, then, wishes to describe the different layers in creating and perceiving virtual objects, people, environments, relationships, and transactions. It is an attempt to structure and integrate a number of concepts that people use in thinking about virtual situations. In doing so, it will probably depart from the traditional definitions of realism, truth, metaphor, and fiction. Hopefully, it will take away some of the confusion and allow for a systematic analysis of virtual

encounters – make it conceivable instead of perplexing – and be the first entrance to understand what creativity is about (Hoorn, in prep.).

Such a framework of analysis may have consequences for various application domains. Understanding what fake identities are may affect jurisprudence. Knowing how people respond to virtual exercise coaches on the Web may affect public health. How the comprehension of a visual metaphor connects to the attribution of truth is of interest to, for example, online marketing. Knowing which design features make a virtual environment more realistic or not may guide the development of multimedia technology and creative content (e.g., visual arts).

There are many questions to think about in writing a book on virtuality. Why are people so occupied with things that are not real, pretence, fiction? Kids can be completely absorbed in their play. Some adults have studied Dante's *La Divina Comedia* for all of their lives. Millions of users are online in virtual worlds such as Second Life, There, OpenCroquet, Active Worlds, or Kaneva (Mennecke et al., 2008). People weep in front of soap operas; scholars fight intellectual wars over hoax articles such as Sokal (1996). The Columbine killers are said to be inspired to their massacre by playing the Doom game. How come? What is so involving about fiction? Why would I feel sympathy for Don Quichotte? Why do I like to dance with virtual friends in a virtual nightclub?

Because new media affect so many aspects of our lives, the book has to take a multidisciplinary perspective and hence is agnostic about its sources. It covers communication and cognitive studies as well as biology, computer science, and literary theory. The purpose of citing all those disciplines is to explain but one chart, which you will find in the last chapter. That chart depicts the "Epistemics of the Virtual," a semi-formal representation that proposes how people make sense of what is real or not. Of course, this graph runs the risk of being over-pretentious, incomplete, or overly complex but we have to start somewhere if we want to provide a unifying account of such diverse phenomena as genre labeling, illusions, animated agents, and metamorphosis.

Much of this book deals with the notion of fiction and until we reach the chart in the final chapter, we will be wrangling with that notion all of the time. Because we come across many different aspects of fiction, this will stretch the term such that it goes beyond the typical meaning of the word, which is usually confined to a genre in literature and film that deals with things that are factually not true but at the time of creation were fabricated or 'made up.' I want to probe to what degree scientific models, hypothesis testing, and representations of the physical world are acts of fiction. At times, I would want to consider anything untrue or unproven to be part of fiction. For now, I tentatively advance the position that fiction is discovered when an observation runs counter to someone's belief system

(‘contrafactual information’). This is certainly not a conventional definition of the term and certainly not all there is to it but let us see where it will bring us in understanding virtuality. As a first introduction to what I am hinting at, we will look at examples that I would regard as being part of the realm of fiction: Camouflage and mimicry, lying and deceit, child’s play, the arts, placebo effects, and the genesis of scientific ideas.

To add to its virtual allure, this work is published as an eBook with a paper counterpart. In the eBook, hyperlinked images are readily retrievable from the Internet by clicking the figure captions. In the paper version, the book’s Web site contains the corresponding URLs. The list of referenced figures can be found at the end of the book. This solves many of the copyright issues of putting pictures in print.

1. Where does it come from?

It is surely amazing that we understand things that literally are not there. It may have to do with the development of memory, keeping in mind images and events of the past to contemplate different scenarios of the future. This capability of storing impressions of people and places that are not actually present, manipulating their order of appearance, the way they act, changing their looks, is beneficial to prepare for new situations, contemplate the various scenarios, imagine other stories, people, faces. Imagining fictions is a means for creative explorations. However, it also creates the possibility to lie about past events or to deceive people with false promises. Moreover, if we materialize these creative ideas as painted images, written texts, or manipulated photographs, we can make people believe that certain things happen or that certain people exist although they do not. After all, the observers can *imagine* that this is the case.

Being able to put up a fiction is not just a human capacity. Human beings are not the only ones capable of pretence, play, or suggesting something they are not. Animals can lie when they communicate (cf. Trivers, 1985). They can act dead or wounded. The lapwing (*Vanellus vanellus*) simulates that her wing is broken to lure away predators from her hatchlings. But this is still behavior of basically intelligent creatures. However, certain creatures with hardly any cognition going on in their brains evolved special features to outwit other creatures with fiction as well. Mimicry and camouflage are inborn techniques to deceive another being into believing that “I’m not here” (camouflage) or “I’m something else” (mimicry). Next follow some striking examples.



Figure 1. Amber snail infected by a flatworm that tries to make tentacles look like caterpillars (a, b).

When the parasitic flatworm called *Leucochloridium paradoxum* infects the amber snail, the worm sends tubes of spores into the snail's eye-tipped tentacles (e.g., Smith Trail, 1980, p. 87). The tentacles expand, grow colorful shiny rings, and start to pulsate. They are meant to look like two crawling caterpillars to attract the attention of predatory birds (Figure 1). Chemicals interfere with the snail's brain, sending the snail up the trees, where it is hot and dry. Because the tentacles are swollen, the snail is kept from retreating into its shell. The bird tears off the caterpillar-tentacles and in its droppings, spreads the worm's eggs, which are eaten by new victim snails.¹

In other words, the bird is fooled by a worm. The bird thinks that the infected tentacle is a caterpillar, whereas the flatworm acts as a performer who uses the snail's tentacles as hand puppets to create a show of crawling caterpillars for its audience of birds.

Not only phony caterpillars but genuine caterpillars too can play tricks on their attackers (e.g., Pough, 1988, pp. 81–82). For instance, when the caterpillar of the hawk-moth butterfly *Leucorhampha ornatus* is at ease, it resembles a twig. Once it is disturbed, however, it turns its tail over and pumps it up, while waving it at its harasser. To ward off birds, the caterpillar turns from imitating a twig into simulating a tree snake (Figure 2). Again, the mimicry suggests that one thing (the caterpillar) should be taken for another (a twig or a snake). In this case, the hawk-moth caterpillar changes the form that helps to stay unnoticed ("I am only a twig") into a form that makes it look scary ("Back off, I'm a snake").



Figure 2. Non-human make-belief. Mimicry of the hawk-moth caterpillar.

Butterflies also have other means to escape from their aggressors. Well known are the color patterns of moths that look like tree skin. If the moth does not want to be caught, however, it should stay on the trunk and not sit on a green meadow. Glass wing butterflies, however, have found a way to become transparent (Hall, 1996). The tissue between the veins in its wings are translucent so that it can change sur-

1. For a video clip of the snail tentacles that resemble caterpillars, check out http://www.youtube.com/watch?v=EWB_COSUXMw

roundings while always be in camouflage (Figure 3). “You can see right through me,” she says. “Although you think I’m here, in fact, I’m not.”

Figure 3. Glass wing butterflies, the ultimate camouflage (a, b).



As can be seen from these examples, dealing with fiction in the form of fakes and frauds is widespread and only natural. Mimicry and camouflage may be seen as an animal’s psychological weapons (Hingston, 1933). Our human counterparts of these techniques are lying and deceit. Therefore, the way false representations work should be analyzed closely so that we can enjoy them (e.g., in art) and not be victimized by them (e.g., when cheated upon).

2.1 Fakes and frauds

It seems only natural to lie because it has benefits for survival and wellbeing. Creating a fiction through lying may help acquire the necessary information or helps to avoid punishment (e.g., Cole, 2001). Army soldiers wear camouflage to deceive their enemies (cf. the butterfly on a tree trunk). Undercover detectives infiltrate a criminal organization by imitating the suitable style and behaviors (cf. the flatworm example). In this sense, fiction is established when deliberately telling untruths, by tactful white lies, social insincerities, or political rhetoric. And sometimes the fiction is not meant as a deliberate lie but is the result of a mistake.

There seems to be no day without people telling bigger or smaller lies. People do not consider them too harmful and do not worry too much about being caught (DePaulo et al., 1996). One can lie to harm but also to protect others (DePaulo, 2004). Perhaps in no other area “is the line between good and evil more blurred than in the case of lying and deceit” (A. G. Miller, 2004). Sometimes lying can become so compulsive or pathological that psychiatrists consider it a mental illness (*Pseudologia fantastica*).

One way to catch a lie and to expose the fiction is to ask for evidence, which is common practice in the scientific community. Unfortunately, however, this approach is not watertight. For example, a highly credible journal like *Science* with highly credible reviewers was fooled twice by the fabricated data of professor Hwang from Seoul National University in Korea (Hwang et al., 2004; 2005). Professor Hwang and his colleagues studied stem cells (pluripotent cells that can be functional for many kinds of tissues) to repair human tissue with its own cells. Professor Hwang claimed that his team cloned a human embryonic stem cell and

‘showed’ that the DNA was identical to that of the donor. He moreover claimed to have generated patient-specific embryonic stem cells from cloned pre-embryos. Being relished as a scientific hero at first and a true stem-cell pioneer, professor Hwang’s ‘evidence’ was a duplicate of photos instead of duplicates of cells (Figure 4). So the world was fooled by media use (copy-paste). *Science*’s initial explanation was that this was only a photo mix up, an error that did not harm the main conclusions of Hwang’s papers (Ebert, 2005). After a research committee went over Hwang’s work, however, *Science* had to retract the two articles (Kennedy, 2006).²



Figure 4. Photoshoped ‘evidence’ of stem-cell clones.

In other words, we need to make a firm distinction between someone’s credibility (whether we consider a person trustworthy and believable) and the correctness of the information a person dispenses. *Science* as a journal is a highly credible source but the information it presents is not necessarily correct (and hence, ‘fiction’). A university professor supposedly is a highly credible person, but well...

Let us suppose that some piece of information is correct, then there are still all kinds of interpreters who bring the news to us. Television, newspapers, and Internet newscasts handle information their own way (Box 1 provides an audacious example). ‘Dolphins communicate like humans by calling each other by name’ so the BBC reported (BBC News, May 8, 2006).³ “Dolphins name themselves with

Box 1. Newspaper fraud

In 2007, Faure and Riché of the Internet newspaper *Rue89* revealed that the highly estimated research journalist Alexis Debat published fake interviews with world leaders in outlets such as *The Financial Times*, *Time*, and *The US News and World Report*. He was caught when he published an ‘interview’ with presidential candidate Barack Obama, whereas the candidate’s press office did not know about the matter and became suspicious. Alexis was often consulted (e.g., by ABC News) as an expert on Middle East terrorism although most of his stories were made up (Retrieved Aug. 27, 2009 from <http://www.rue89.com/2007/09/15/how-alexis-debat-managed-to-cheat-everyone-in-washington>).

2. Read about the whole story at <http://www.sciencemag.org/sciext/hwang2005/>. At MSNBC, you can read an article about the Korean apology (<http://www.msnbc.msn.com/id/10811959/>).

3. Retrieved Dec. 13, 2007 from http://news.bbc.co.uk/1/hi/scotland/edinburgh_and_east/4750471.stm

whistles” is what National Geographic News announced (Owen, 2006). And if we can rely on the quotes of the principal investigator Vincent Janik (St. Andrews University), this indeed could be assumed. Janik for BBC News (May 8, 2006): “I think it is a very exciting discovery because it means that these animals have evolved the same abilities as humans.” That actually was quite a sweeping statement considering the evidence Janik reported in the scientific paper for the National Academy of Sciences (Janik, Sayigh, & Wells, 2006). The results tell us that the scientists used no more than 14 animals of which only 9 responded by looking into the direction of where the sound of the close relative came from, three did nothing, and two actually turned their heads away. If the dolphins could look left or right, that means only 2 dolphins acted above chance level ($2 = 50\%$). The news reporters need not be great statisticians to know this was quite a small basis to pass on the word that ‘dolphins name themselves’ or that they ‘communicate like humans.’ In other words, fiction may transpire not only due to lying but as the case of the talking dolphins illustrates also because information is delivered in a biased or exaggerated way. It is not untrue but not quite realistic either.

2.2 Placebos

There are also examples in which bending the truth a little has beneficial effects. The stem-cell case was sheer academic fraud and the dolphin example an over-generalization of an interesting observation but, for instance, using placebo drugs without knowing that they are not pharmaceutically active may be ‘deceitful’ but does yield positive health effects.

Placebo drugs in medical treatment are often seen as pleasers (cf. Box 2) rather than active medicine, the notorious ‘sugar pills.’ Users would mistakenly think that the drug affects the malady and this ‘illusion’ would positively impact recovery. Certain people may object to telling a white lie like this but apart from the pragmatic position that whatever helps should not be expelled; the white lie of the placebo treatment also is functional for empirical control of the effects of real phenomena.

Box 2. The word placebo

“Placebo Domino in regione vivorum” (I will please the Lord in the land of the living) (Psalm 114, verse 9). In the Middle Ages, mourning at a funeral was often left to hired stand-ins. These mourners would sing Psalm 114 and hence were called ‘placebos’ (De Craen, 2004).

What if a pharmaceutical laboratory developed a drug against depression and all they did was test it against baseline? Then any improvement could be attributed to the drug but also to the idea of doing something against the disorder. Some personal care and attention for the patient might have done just as well. Using a placebo drug (and thus, a fiction) provides an experimental condition that tells you how the medically active drug performs as compared to the psychologically active substance. If they do equally well, the company saves on drug development and the patient saves on the intake of chemicals. It even goes so far that large-scale meta-analysis indicated that people with less-severe forms of depression showed less drug response or change from baseline as compared to the positive effects of placebo treatment (Entsuah & Vinall, 2007). That certainly does not mean that you should trust the street vendor who promises you miracles. The quack, of course, should test the alternative against a pharmacologically active substance to make a point (Figure 5).



Figure 5. Dr. William Wright's Indian Vegetable Pills. Catalog M-10413, Acc. 246707, Negative number: 83-4929, Science, Medicine and Society Division, NMAH (a, b).

3. Creativity, play, and arts

It almost goes without saying that children learn through playing (e.g., Russ, 2004) and that we do not stop to learn by playing throughout adulthood. In 2012, the global toys and games market is expected to be worth US\$122.2 billion (*Global Industry Analysts*, 2008). Increasingly, computer and video games claim a large part of that market's turnover. In 2008, the video game and console market alone was worth US\$21.3 billion. Digital games for entertainment are acclaimed to sort learning effects (e.g., Rauterberg, 2004) and indeed, there is a rising trend to develop serious digital games for learning (e.g., Gros, 2007).

Runkeeper and the *Nike+* app stimulate users to move by playing games while being coached by a sound bite of Lance Armstrong.⁴ Location based services such as *Foursquare* and *Gowalla* reward people for checking in at certain places.⁵ *Figure*

4. <http://runkeeper.com/>

5. <https://foursquare.com/>; <http://gowalla.com/>

running is a new creative hobby,⁶ where people run for miles through the landscape to draw figures on Google Maps (e.g., a bird, a star), which you can show to your friends on Facebook or look up on your iPhone. In Massive Multiplayer Online Role-Playing Games (MMORPGs) such as *Entropia Universe* (MindArk),⁷ *World of Warcraft* (Activision Blizzard), EVE Online, Warhammer, Age of Conan, or EverQuest, a new digital economy emerges where digital items (e.g., weapons, land, islands) are sold for real-world money. In *Entropia*, the virtual nightclub Club Neverdie and a number of mining rights were leased out for US\$600,000. McGonigal (2011) speaks of the gamification of society, arguing that games will make people happier, better motivated, more social, and instilled with a sense of meaning.

The world of child's play usually is an imitation of the grown-up world they are preparing to enter. In particular role-playing games such as playing mum and dad, doctor, or cops and robbers provide opportunities to freely and safely explore social rules, occupational cultures, and moral boundaries. Children act out situations, negotiate the dialogs, confirm the 'as if' aspect, mix realistic elements with pure fantasy, and all in all, do something that in the grown-up world would count as stage acting. For adults, training simulations work quite the same way. Squat teams practice how to liberate hostages, firefighters rescue people who play dead or wounded, jet pilots practice their skills in a flight simulator, and managers analyze their behavior at work with the help of an actor. *Entropia Universe*, for instance, is used by NASA and ESA to develop educational games for space travelling.

Through playing different scenarios, children and adults alike can explore the problem space of a given situation and try out different solutions without causing real damage. Apart from entertainment or aesthetic reasons, this may also be why people produce and consume literature, art, and movies: To discover new aspects of a situation, test moral boundaries, contemplate possibilities, and be prepared for a variety of situations without immediately having to deal with the real-life consequences.

Fictional characters are used as sources of information about the real world and serious life events (e.g., Buck, 1999; Busselle, 2001; Prentice & Gerrig, 1999, pp. 529–530; Shapiro & McDonald, 1992). In *Full Metal Jacket* (Kubrick, 1987), one of the soldiers is repeatedly hit by an enemy sniper while the platoon is hesitant to save him. Do you put your team at risk to save just one member? What if you had to pretend you're a lesbian and sleep with a client to get the deal done

6. <http://www.figurerunning.com>

7. <http://www.entropiauniverse.com/>

(*Switch*, Adams & Edwards, 1991)? Arts and play create a fiction with the purpose to entertain and learn in an explorative way.

4. Science and technology

Exploring different situations through play is an intuitive, often implicit, and unsystematic way to generate hypotheses about the world and to test them informally. It is useful for personal reasons but hard to repeat by others and with rather uncontrolled results. In science and technology, making hypothesis and testing them can be done in precisely the same way but more often, creating scientific hypotheses is more theory-driven and obeys the demands of being systematic, controllable, and repeatable. That does not mean, however, that science has to or even can exclude fictional elements (cf. A. I. Miller, 2000, Chapter 7).

Science attempts to create a model of the world, an abstraction or a representation of what physically exists. It tries to do so with a minimum of words; the most concise description should cover the largest possible number of phenomena. Through direct and indirect observations of the many manifestations in the physical world, scientists have an impression that they call 'reality.' To bring order into that scatterplot of impressions ("data"), scientists filter out a pattern and model this, for example, in the form of a formula, a grammar, or a simulation. The formula, algorithm, or model is the fictional aspect (how we think the world is) and it needs to be confronted with the physical world again to sharpen the concepts of reality it is composed of. The model should have acceptable predictive power. After testing the prediction in a real situation, scientists then may conclude that the model forecasted the right outcome and that they identified the mechanism correctly. The scattered image of reality becomes more coherent. If not, the model needs to be adapted (it becomes more realistic) and will lead to more precise predictions that are tested in the next round.

However, there is no model of the empirical world that does not have 'noise' or 'tension;' there are always things left unexplained. Poincaré called this the underdetermination of theory (A. I. Miller, 2000, p. 35). There is always room for doubt, the possibility that the model or representation is wrong. In other words, there is always a part – and it may be a tiny part – that is fictitious, guesswork, unverified. We could regard this as a failure, a flaw in the human mind to have a perfect conception of the world we live in. You could also see it as a sea of opportunity. If we can talk about the world only in terms of probabilities and not in absolute truths, this also opens a whole new vista of hypotheses to be tested, limited by our fantasy alone.

Let us look at an example where a scientist used his imagination to create new hypotheses about the physical world. James Maxwell (Figure 6) was interested in electromagnetic field theory and to establish a model of electromagnetic induction in the ether, he drew an analogy between circling vortices and rotating gears (Nersessian, 2002). According to Nersessian, Maxwell envisioned the circling vortices as “spinning wheels” and used this as a general model to compare with gear systems. In using this analogy, Maxwell was capable of explaining how the motion of the ‘wheels’ had to stop due to friction.

Figure 6. James Clerk Maxwell (1831–1879).

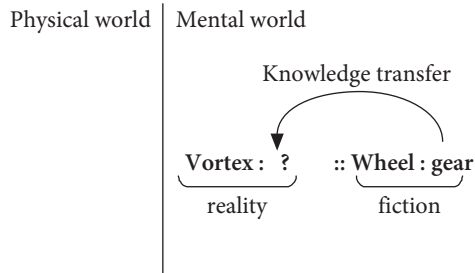


Figure 7. Maxwell's analogy has a fiction element.

To put it schematically (Figure 7), Maxwell compared a vortex to a wheel, which in itself is not empirically true. Vortex-ether is not a wheel so that in a way, this was putting up a fiction. However, it was a very productive fiction because Maxwell could transfer the relationship between wheels and gears to whirling vortices and think of ‘something’ (the question mark in Figure 7) that would establish the same function between vortices and that something as between wheels and gears. A happy use of fiction to understand the mechanisms of the physical world.

5. Why a theory of fiction?

Out of curiosity. It is surely amazing that people can contemplate situations that have never occurred and that never will occur. In addition, it enables their creativity so that they can make complete worlds out of them (e.g., Second Life, Star Trekology) in which they can be so absorbed that their real life becomes subor-

dinate. In addition, these compelling worlds can be so crazy (from Bosch to Dalí, from Alice to Avatar, from John's Apocalypse to World of Warcraft) that it makes you wonder what else the human mind has in store. Thus, there is the fundamental interest to understand what fiction is or how it comes about (also see Hoorn, in prep.).

Out of concern. A theory of fiction would serve not only to help clarify our relation to such obvious cases as literature and the arts, but to a wide range of "mediated" experiences. Much information we encounter is second hand. We read newspapers, scientific journals, novels, watch TV, listen to hearsay of our neighbors, or play a song on our MP3 player. We are ready to believe these messages and work with them without knowing in how far we can trust the information, whether there is truth in what they say. Yet, fake, fraud, and fiction are all around us. Even the animals lie when they communicate. Media, from tribal narrative and book scroll to virtual reality applications, cannot but provide a rendition of a person or a situation, with more or less deliberate mystifications, and that rendition may differ from our own interpretations.

Increasingly, new technology and new media bring fiction into our lives in the form of virtual or augmented realities or as 'friends' that we made on Facebook and it is not too certain that we recognize these new forms of expression as fiction, like we do with novels and paintings. Many virtual worlds, organizations, and communities claim the same status as newspapers, documentaries, and photographs do: They are so realistic that they can actually represent or even replace reality or at least the experience of reality. Yet, fiction is not always a pleasant experience. Mr. Sokal, the hawk-moth caterpillar, Don Quichotte, professor Hwang, flatworm *Leucochloridium paradoxum*, Ulysses' one-eyed giant, Dr. William Wright prescribing vegetable pills, Vincent Janik; they all tell us one thing. Life is a wonderful pandemonium of fictional encounters, a fantastic place of pseudo-logics but you can enjoy it only if you understand it and do not become victimized. Helping you acquire that aesthetic distance towards new-media applications, fake identities, quasi-realistic simulations, hoax viruses, and so forth is what the remainder of this book is all about.

Because we cannot do it any differently. There is no science without imagination. And although that imagination of scientists is fine-tuned towards the world of existing things, many models of the world will finally be rejected. After all, hardly any scientific model of the past survived the 20th century and the 20th century models will be replaced by the new models of the future. Because humans need to anticipate future situations (which are hard to imagine) and reckon with things that happened in the past (which are hard to reconstruct), and because humans have to deal with insecure messages in the here and now, we are in need of a theory of fiction.

In *Bentham's Theory of Fictions* (Bentham & Ogden, 1932) and *The Philosophy of As-if* (Vaihinger, 1952/1924/1911), it is argued that as humans we have to treat our models of the world as if they were true because these fictions help us survive. We would be willing to accept falsehood in order to safeguard peace-of-mind in an illogical world. It would be almost impossible not to live in a fiction, because many of the phenomena we acknowledge to 'know' are not from direct observation; we assume that they are there or have been there (from sub atomic particles to historic figures). 'We behave as if the world matches our models' (after Vaihinger).

Therefore, a theory of fiction should not address so much what knowledge is in a philosophical sense but rather what people consider to be knowledge pragmatically, how they acquire it, and what they think they know. Such a theory should be an epistemics of the virtual, "the construction of formal models of the processes – perceptual, intellectual, and linguistic – by which knowledge and understanding are achieved and communicated" (Longuet-Higgins, 1969/1977, p. 209); in our case, with regard to fiction.

Because of the opportunities. Fiction is an act of creativity and with the advance of new media and new technology completely new expression forms emerge that can induce a positive experience (e.g., digital art, virtual therapy). A considerable body of evidence shows that thinking of ourselves as competent, in control, nice, and with a bright future ahead of us – even if you are in dire straits – is a normal human response to trouble (Taylor & Brown, 1988). It even goes so far that unrealistic, inaccurate but positive perceptions of the self promote mental health and stimulate empathic behavior, productivity, and creativity (ibid.). Not only is a biased self-image an act of fiction, virtual environments and people can be programmed such that they make you feel competent, in control, nice, etc. Virtual worlds can boost a positive self-image by setting the difficulty of a game or puzzle such that you face the optimal challenge, by allowing you to speed-date software agents that adore you, or by providing help in overcoming spider or space phobia (cf. 'healing fiction,' Hillman, 1983). So what is the use of fiction provided that it induces a positive experience? It keeps your mind healthy, makes you care about others, is good for the industry, is good for product development. It helps you to explore possible situations, tests your morals and your beliefs, it is the way we learn and the way we do scientific discoveries. When used as a (self) deception, it is a way to survive.

We are in need of a theory of fiction and where possible, it should be empirically based and draw on the important cognitive work that has developed over the last several decades. However, in line with Bentham and Vaihinger, that does not guarantee us anything about its correctness. It is just a way to make sense of the world.

6. The liar paradox

One of the major theses of this book is that anything mediated should be regarded as fiction and what comes through direct observations should not be taken at face value. Yet, this book is a medium, what it conveys comes to you as indirect information, and thus by definition, it is another fiction story. Nevertheless, I want you to take its contents seriously but it seems I shoot myself in the foot as I make my point.

A book that wants to say something true about fiction must be telling fiction because it is a book. Actually, this perspective is another instantiation of the liar paradox. My book would state that “this book is false.” If the book really is false, it is not lying. If the book is lying, it actually is not false. The problem roots in the self-reference of the lie. From Russell to Wittgenstein, people have cracked the liar paradox in different ways (see Dowden, 2010 for a list of solutions) and that would save my work from being dismissed as fiction.

However, my answer is simpler. You may regard this book as a fiction story but that does not mean you cannot learn from it (Section 3). Things that seem true are only true to a certain extent, which in certain belief systems, may acquire an absolute value (‘true’). Thus, things that appear to be false are false to a certain extent and according to certain belief systems, this may be an absolute case (‘false’). Dependent on your personal beliefs, then, you have the option to regard things partly true as well as false, that is ‘vague’, whereas I present them to you as clear. Reversely, you have an option to belief things are clear where I claim that they are obfuscated. The mere purpose of this book is to provoke your mind and find your own position in relation to the one I offer you. Sometimes I deliberately play with being a truthful author or not to make you aware how feeble belief systems are and how hard it is to trust your wit and senses. At those times you experience that your epistemics is tried and tested through virtuality.

My use of reference works has to do with this position. *Epistemics of the Virtual* pursues the scientific study of what people believe they know in virtual situations. Therefore, I want to follow the academic procedures and prefer to cite from scientific work that is thoroughly controlled and validated, which may help me to approach truth. However, the undertermination of theory and the limitations of experiment and data analysis remind me that even good science does not equal truth. Actually, I think science can merely claim higher probability as compared to lower probability of non-science. I consider well-tested theories a more realistic rendition of the world we assume about us but they stay completely open to change. In other words, where science falls short of answers or does not provide the examples to make my point, I also cite Web sites, comic books, television programs, newspapers, and poems. Not because I believe their statements are better

tested but not testing them does not make them meaningless. It is just that we do not know yet how probable they are. The presentation form of non-academic work is of no concern; that is a mere aspect of rhetoric just like scientific style is mere rhetoric: It does not make the contents any more correct.

Throughout this work, I make a strong case that the line between fiction and reality is hard to draw. Moreover, the inference will be made that any distinction is fundamentally problematic (i.e. what is a metaphor, what is literal; what is virtual, what is real; what is science, what is non-science; what is deception, what is honest; what is genius and what is insane). By contrast, I also will present cases where I suddenly suggest that the line is not that murky. Those are the cases where I think sufficient evidence is at hand to make a stronger claim of probability but that should not stop you from disbelieving. Thus, any binary decision that I present to you in a process model or graph (i.e. Chapter 6) could and perhaps should be read as a fuzzy decision with more or less likelihood. You will find that sometimes, the revered empirical and cognitive work that I cite is mute about the *connection* between certain fictional or virtual occurrences so this is where I have to be creative and become speculative myself. However, I am prepared to be erroneous because with Bern (2003), I want to conclude this Introduction and open this free exploration of virtual space by stating: “Let us err on the side of discovery.”

7. Overview

In this book, I draw on extensive experimental research plus cognitive theory – prominently computer modeling – to formulate a theory of fiction, i.e. an epistemics of the virtual. This Introduction explains the need for such a theory, focusing on the enormous number of cases in which fictional elements are part of our daily business and the impact fictitious events, phenomena, and beings can have on us.

Chapter 1 is concerned with the analytic problem of distinguishing fiction from reality and explains the role of belief systems and the attribution of truth and probability, as well as appraisals of realism (epistemic appraisals) in judging a situation as fiction or ‘real.’

Chapter 2 deals with the importance of genre knowledge in attributing ‘truth’ to a message. If we know that something is a documentary, the information is ‘more true’ than when that information appears in a fairy tale.

Chapter 3 discusses metamorphosis, impersonation, and metaphor to show that our belief system hampers when it comes across inconsistent input. We then face the dilemma that the observation may be incorrect (i.e. perception biases) or

that the belief system needs adaptation. This makes it even harder to claim that a mediated message or what a mediated figure does is ‘really true.’

Chapter 4 argues that certain people tend to fuse fiction and reality more than others, who tend to separate things. A signal-detection approach to illusions may clarify why some say that anything outside science is fiction whereas others say that there is nothing *but* fiction.

Chapter 5 discusses the affective responses to virtual people to illustrate the position that there is more than the perception of realism in our responses to fiction. Certain factors, such as the moral standards of a character, feed back into truth claims as well.

Chapter 6 combines all these insights into one integral *Epistemics of the Virtual*. This theory aims to provide an analysis tool that helps to disambiguate our wonderfully deceitful world and puts the first step towards a software system that teaches robots and computer simulations of human behavior how to decipher fiction from reality, just like us. *Epistemics of the Virtual* is also the first step any person makes to transition from a perceiver into a creator (Hoorn, in prep.).

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CHAPTER 1

The reality-fiction friction

“... the flute-playing faun and the water spirits. Something naturalistic belongs to all these creatures. They appear as unreal and yet as graphic copies of something practically real ...” (Adorno, 1982, p. 198)

In this chapter, I attempt to formulate a framework to analyze, understand, and explain the differences between things we consider fiction and things we consider reality. It all starts with the belief system we adhere to, upon which truth is attributed to things encountered in the world. The belief system is established through upbringing (religion, culture, science, education) and updated through personal experience. The belief system is formed through consistent, reliable, and trustworthy behavior of the parents, which induces a feeling of security and safety with the child. Because of this, truth claims have a moral side and ultimately rely on authority.

When experiences in the physical world run counter to the belief system, doubt is induced and the feeling of security is no longer guaranteed. This is what fiction does all of the time; it is “unsafe.” If you are a strong believer, the inconsistency with your beliefs will be regarded as ‘wrong perception.’ If you are self-skeptic, the beliefs need adaptation. The belief system predefines what is true and based on that, phenomena in the physical world are classified as fiction or reality (ontological classification). Yet, these are judgments on a global level, trying to categorize the complete instance (e.g., people cannot fly with wax wings). At a more detailed level, fauns and water spirits can have a most realistic allure. The wings may look like real wings, the wax may be real wax, and the person playing Icarus may be a real person. These epistemic appraisals lead to an experience of realism that can be so strong that it overpowers the conceptual classification of a stage play or Virtual Reality environment as fiction.

1. Fiction versus reality

What do we regard as fiction and what as reality? Vexed questions. In the Introduction, we used these words rather loosely but it is only now that we can try for something that could count as a definition although I have to quickly add that

definitions will only be tentative and that they are subject to change until the final chapter. At this place, strict definitions are not productive to explore the relationships between reality, beliefs, representations, realism, and so forth. This chapter merely offers a framework for discussion and probably runs counter to classical notions of crucial terms such as fiction and truth.

1.1 Physical versus mental world

One of the first distinctions we should make is that there are two realms so to speak, the external and the internal world (Bois, 1972). The external is the empirical world with all we can see and touch, the people, the objects, and this we call “reality.” “Reality,” then, is nothing but a name for the external world that is represented internally by mental constructs and human-made abstractions. Reality is a set of structural transformations abstracted by the mind from the phenomenal world (Stent, 2001, p. 36). Somewhat provocative, Bois posed that “our world is what we say it is.” A. I. Miller (2000, p. 12–13) speaks of the “theory-ladenness” of data.

However, there is a catch. Humans are capable of looking at their internal world and have a notion of it. We can do ‘self-diagnosis’ and create an internal representation of our own internal physiology (“I feel lousy, I am ill”). Thus, reality indeed is the name we give to a set of representations (or ‘knowledge’) of what is externally about us but includes that part of the internal world that the observer has a notion of – as long as it is not an abstraction. The physical world, then, is the outside together with that part of the inside world that is material and concrete. The abstractions and the thoughts about abstractions are the non-physical, mental aspects. They may have effects that materialize in the empirical world but the mental world itself is not physical.

1.2 Information, beliefs, representations, knowledge

What we call “reality” is dependent on the physical as well as the mental world; on introspection, representation, and perception (Audi, 2003). The qualification of something as “reality” is purely subjective and relies on the whole of our representations of the physical world, whether these representations are correct or not. The “real world” is a construct (Hebb, 1975); thus, incorrect representations also sustain our notion of “reality” as long as there is no counter-evidence. Indeed, “... most of the knowledge claims we make in ordinary life, are simply incorrect” (Kirkham, 1984, p. 512). Before Copernicus, the Earth was placed in the middle of the universe and this representation of reality was shared by many others. In

other words, “reality” can be purely subjective and based on mistaken assumptions. Nevertheless, it can be shared by more people so that “reality” becomes intersubjective and dependent on consensus in a (social) group (cf. Corlett, 2007).

Mental representations of the physical world are (usually imperfect) images or models, shaped by all sorts of perceptual, conceptual, processing, and other biases due to the structures and processes of our physiological, cognitive, and affective architectures (cf. Stevens, 2001, pp. 181–189). Although the information may be out there (‘data’), our senses may not be able to detect it so that our impression is incomplete. Our world view would be different if in daily life we could see in the ultraviolet or hear beyond normal human hearing range (20Hz–15kHz). For a bee, the (ultraviolet) color patterns of a flower are different from the patterns we perceive. For dogs and elephants, the world of sounds is much richer than for us. Lettvin et al. (1959) discovered that frog eyes can detect but four features: Line contrasts, illumination changes (cf. predators), motion, and curves of tiny dark objects (cf. flies).

From the frog example, Zander and Zander (2000, p. 10) conclude that the frog’s eye delivers extremely selective information to the frog’s brain, geared towards existential survival alone. They contend that “the frog perceives only that which fits into its hardwired categories of perception” and conclude that humans too perceive only the sensations they are programmed to receive so that people recognize but what was already stored.

Stent (2001, pp. 36–37) indicates that information about what we call “reality” does not come as raw data of the phenomenal world but is abstracted and transformed into structures and therefore is partially invented by the mind. Stent gives an explanation of information processing that could be interpreted as a signal detection account in which the signal or pattern of signals is filtered and cleared from information that is not in line with the stored conceptions (“selective destruction of information”). Noise is filtered out and missing data are imputed so that the pattern or structure becomes evident to its perceiver. That data are reduced until a pattern remains that people find meaningful is supported from epistemology to the natural science of pattern recognition and neuroscience (Pfenniger & Shubik, 2001b, p. 222).

Hence, free-floating data in the physical world (e.g., a sound wave) become information once they are encoded in the mental world (“I hear something”). Yet, information as such is useless for people if it is not interpreted and integrated with earlier information (“It is a word!”) and, for example, through inference is integrated with internalized assumptions about the world (“It must be a person and not a bird”). These internalized assumptions (e.g., “Only humans speak words”) are the beliefs, convictions, or self-evident premises someone has (cf. Kirkham, 1984). Beliefs may be personal or shared or ‘compatible’ with the beliefs of others.

Beliefs are more-or-less fixed axioms about the world's state-of-affairs and we regard them as "true" with little room for change or doubt. They are self-evident to a certain person although they might be empirically or logically false (Kirkham, 1984) (e.g., a parrot can speak words as well). When the information and beliefs are integrated one way or the other, they form mental representations of the physical world. All these representations make up our body of knowledge about the world. In other words, knowledge has a cognitivist element in that it consists of representations of the physical world but it also has a constructionist element in that the integration of incoming information with fundamental beliefs sometimes is an act of construction and creation.

Knowledge is more susceptible to doubt and change than beliefs are (cf. Lachman 1983, pp. 566–567), although both might need more evidence than is expected in ordinary life (Kirkham, 1984). Elsom-Cook (2001, p. 61) speaks about "socially defined Platonic knowledge," which is the property of a community of 'expert practitioners' with compatible beliefs mutually established among the group members. As long as this knowledge store is stable, it is regarded as 'true' in the Platonic sense (*ibid.*).

The stronghold of knowledge are the beliefs it is based on, the vulnerable part is in the information it has integrated into those beliefs. Yet, we do regard our knowledge, this set of ambiguous mental representations, as reliable enough to call that part of the physical world it describes "reality." We also regard this set of representations good enough to say that we "know" what is real and what not, and act upon that reality.

1.3 Beliefs are culturally determined

In the previous section, we defined beliefs as fixed and self-evident axioms about the world's "true" state-of-affairs. We have many sources for beliefs. The classical tradition at least distinguishes personal experience and inference along with authority (Section 1.6). Many perceptual, conceptual, processing, and other biases occur in belief formation due to the structures and processes of our cognitive and affective architectures. Yet, we can share our beliefs with others and we group people on the basis of the general beliefs they share and regard those as 'part of their culture.' As Hofstede (1980, p. 260) puts it, culture is 'the collective programming of the mind, which distinguishes one human group from another.'

The personal biases may affect belief formation but commonly this is done within the framework of a culture, which may have religious values, may adhere to a certain scientific tradition, and may apply some sort of educational approach. Erez and Earley (1997, p. 23) state that culture is a shared way a group of people

view the world. Kluckhohn (1951, p. 86) defines culture as ‘patterned ways of thinking, consisting of historically derived and selected ideas and attached values.’ Geertz (1973, p. 89) regards culture as ‘... a system of inherited conceptions ... by which men develop their knowledge about ... life.’ For example, Oriental cultures have fewer problems with contradiction, change, and multiple points of view than Western cultures, who rather think in categorical and essentialist terms (Nisbett et al., 2001). People may be affected also by sub cultures, for example, ethnic, national, or organizational (Straub et al., 2002). Deregowski (1989) provides the example of the Me'en tribe in Ethiopia, who were not capable of recognizing people and animals on photographs because they were not used to the concept of seeing things in two dimensions.

Guided by all these cultural aspects, we establish a set of beliefs about the world. If this set of beliefs shows some coherence, we could call it a belief system (cf. Audi, 2003). Cultures provide us with more-or-less fixed and self-evident belief systems that only need to be ‘tweaked’ or ‘customized’ to our personal needs. Yet, “... the core values resist change more than which are peripheral” (Lachman, 1983, pp. 566–567).

The belief system consists of theories, concepts, rules, systematics, world views, ideas, predictions, and laws. The mental world, then, has a belief system upon which truth is attributed to things encountered in the physical world. The belief system is installed through upbringing (religion, culture, science, education) and updated through personal experience (be that directly or through hear say) – the encounters in the physical world. Because to a large extent, culture determines what is believed, culture has a strong impact on what is held true.

1.4 What can be trusted is true

In this section, I deliberately will mix together the two senses of the word “true,” not because I think the pun is convenient to my purposes but because I think that the concept of truth is heavily related to trust, at least in folk epistemology (cf. Hardy-Vallée & Dubreuil, 2009). In addition, I will argue that people use the heuristic that ‘what can be trusted must be based on truth’ although this is logically flawed and empirically invalid.

The establishment of basic trust starts in early childhood (Erikson, 1950/1993, p. 247; Flanagan, 2003; Cassidy, 2001). Formative and early nurturing experiences provide a sense of security that is crucial to the formation of trust, which is the belief that others are honest (‘truthful’) and do not exploit us although they are capable of doing so (Flanagan, 2003, p. 166). Cassidy (2001, p. 140) contends that secure attachment is related to truth and influenced by the infant’s experiences

with the mother. Cassidy connects secure attachment to Grice's axiom of being truthful and showing evidence for what you say (p. 141). Cassidy argues that secure attachment is associated with validating the truth of the child's experiences (p. 143). This means that the mother can acknowledge how the child feels so that the child infers that the feeling is really there ('true') or the mother can ignore how the child feels so that the child concludes that it is mistaken and that the feeling is not there ('false'). This, of course, may lead to internal conflicts and insecure attachment when the child is hungry but the mother refuses to feed.

Feeling secure is closely associated with sharing the truth with another (Cassidy, 2001, p. 144). From the sense of security, trust transpires (Flanagan, 2003), which is the ontological basis for believing what the world is about (Erikson, 1950/1993, p. 96). Flanagan cites Rotenberg (1994), who showed that interpersonal trust springs from reliability (i.e. keeping promises, showing consistent and predictable behavior).

It seems, then, that truth is highly correlated with being truthful, with trust, and with feeling secure. For a child, it is hard to determine what precedes what but a guess is that the feeling of trust is more accessible to an infant than the notion of empirical (let alone logical) truth. Therefore, I believe that a child uses the feeling of trust or the related "sense of security" (Flanagan, 2003) as an indicator of truth, the ontological basis of the world's state-of-affairs (Erikson, 1950/1993). Hence, although the heuristic is fallible, the assumption may be prevalent even in the life of grown-ups that what can be trusted must be true, something which is corroborated by studies into folk epistemology (Hardy-Vallée & Dubreuil, 2009): In organizational settings, trustfulness indicates truth. The abstraction of what should be regarded as true is determined from what the infant can concretely trust about parental behavior.

In view of Section 1.3, cultural values mold our sense of security and trust (Flanagan, 2003, p. 166) because culture not only influences our belief system but also provides us with a set of more-or-less fixed behavioral rules that help to shape systematic and consistent behavior. This makes people more predictable and therefore, more "safe." Therefore, I believe that since early childhood, we experience that systematic, consistent (i.e. maternal) behavior that is rewarding can be trusted and therefore is 'true' (in the double sense: loyal and factual). That may be an overgeneralization but from a pragmatic point of view, it is the best thing you have as a child and at many times also as a grown-up.

Both mother and father are part of a culture. Their behaviors towards the child, therefore, will be shaped by cultural values. In other words, consistent and trustworthy behavior as defined by the culture shapes the belief system of the child, telling it what her "core truth" is (cf. Cassidy, 2001, p. 144). This consistent,

reliable, and predictable behavior gives the child a sense of security, reassuring the child that next time, the same type of behavior will lead to the same type of (positive) results. Put differently, the way we learn what is true as a child is through our parents, who ideally show predictable and consistent behavior that moreover is beneficial to our needs and never harmful (cf. Erikson, 1950/1993, p. 96) and of which the feeling of trust is the indicator.

Because consistent, reliable, and predictable behavior seems to be fundamental, there should be a match between expectations and concrete events to evoke a sense of security and trust. Expectations are conceptual ideas about future world states and concrete events come to us through sensory input. If these two match, the prediction comes out as expected ('true'), if not, the prediction is refuted ('false') (cf. Stent, 2001, p. 38). As argued, a sense of trust is used as an indicator of truth so that the notion of truth probably transpires in cases of conceptual and sensory alignment. The rule we apply, seems to be 'what is conceptually and sensorial congruent can be trusted and what can be trusted is true.' In other words, the reason to accept truth and to call it reality appears to be trust, a trust based on sensory input and confirmation of concepts that thus far have not been shown wrong, that is, the theory was not at odds with the data yet.

1.5 The ethics of truth

From the Ten Commandments to Thomas Aquinas and philosophers such as Immanuel Kant, not telling the truth and bearing "false witness" are condemned as hurting an individual's moral integrity. Already in early childhood, we are told not to lie and, if we want to be good, we should tell the truth. "Lying carries with it a host of negative moral overtones. Put simply, we are supposed to tell the truth" (Grubin, 2005). Children who understand the moral implications of lying are less likely to lie (Talwar et al., 2002). A. G. Miller (2004) indicates that lying directly affects the line between good and evil. Shalvi, Handgraaf, and De Dreu (2011) studied unethical behavior, operationalized as using bigger or smaller lies to maximize personal gain at a minimum of psychological costs. For the study of eight movie characters that varied in their moral behaviors, Konijn and Hoorn (2005) developed a measurement scale to indicate ethical goodness and ethical badness in a sample of 312 film viewers. 'Liar' formed a scale of ethical badness (Cronbach's $\alpha = .96$) with items such as being mean, aggressive, without conscience, nasty, and egotistic. All these items correlated over $.80^{**}$ (2-tailed) with being a bad person and correlated negatively (over $-.80^{**}$) with being ethically good (Hoorn & Konijn, 2001). Thus, truth-telling may be seen as morally just, whereas lying is largely wrong (cf. Bok, 1999).

Box 1. It is true because it is trustworthy and good

That the association with trust and goodness is used to support truth claims is illustrated by the religious convictions of reverend Klaas Hendrikse, who lectures at the churches of Middelburg and Zierikzee, The Netherlands. He is a self-acclaimed atheist who states that he believes in a God that does not exist (Hendrikse, 2007). Hendrikse does not believe that God exists as a person and that you should not adhere to a faith but rather live faithfully – live in the spirit of a faith. A religious person is someone who experiences the connectedness with other people and trusts that life was meant to be good (ibid.).

What Hendrikse actually states is that God as a higher being is a fictional character but that God as the individual experience of connectedness in the physical world is reality. He states that reality is what you directly perceive in the physical world and if you believe that this is connectedness among people, accompanied by the belief of life's goodness and if you have the capacity of trusting people, you are a truly religious person. The reverend associates goodness with trust to support the claim that his conception of God is true and the traditional view is not.

In a way, Hendrikse's position resembles that of the followers of the Jedi church (Chapter 4), who probably do not believe that Jedi knights of Star Wars (Lucas, 1977–2005)¹ exist but do live according to 'the Force' (i.e. love, understanding, and learning). Because their intentions are 'good' and they are trustworthy people, what they say is 'true.'

¹ Retrieved Aug. 26, 2009 from <http://www.jedichurch.org/>

However, Schein (2004) and Ford (1996) indicate that lying is not an ethical issue per se. People who take a position of "moral relativism" state that deceit is a natural way of human interaction (e.g., D. L. Smith, 2004) or point at pragmatic uses of lies (i.e. white lies) (Ford, 1996), for example, to protect another person (DePaulo, 2004). Although lying may serve a higher cause, all kinds of ethical dilemmas occur because of it. Telling untruth is wrong (untrustworthy individual), which gets into a value conflict with something that has nothing to do with truth-telling, that is, protecting another person, which is right (socially trustworthy). Telling on someone is the mirror image of this situation, where telling the truth is morally good (trustworthy individual) but this may be at odds with the not truth-related value that causing someone to get punished is abject (socially unreliable).

In other words, whether one takes a rigid position of moral integrity or a lenient position of moral relativism, ethics and truth are psychologically intertwined although academically speaking, they are independent. For many people, then, a once acquired belief system has a strong ethical component. True things are good things and vice versa (see Box 1). Because attribution of truth is based on the belief system, which is shaped by the (sub) culture, saying that something is true or not for many people also entails a moral judgment about what is right or wrong.

1.6 Truth claims appeal to authority

People tend to accept authority. That is not strange or unintelligent; it is simply because you do not have the time or means to verify everything that you are told. In addition, from early childhood on, we are used to parents, teachers, preachers, doctors, who tell us what the world and the human condition are about and how they should be perceived. “Knowledge is first seen as certain, definite and transmitted from authority figures; then as something constructed and uncertain; and finally construed as testable and refutable, fallible but based on evidence” (King & Kitchener, 2004).

At first, parents tell us how things work and reassure us that this is true by showing trustworthy behavior. However, with experience, uncertainty grows. Some parental stories are incomplete or other people have different explanations. We slowly discover that the accounts of the parents do not apply to all cases. In later stages, rationalization of this uncertainty leads to more systematic ways of verifying statements about the world. Yet, every single person has to accept some evidence in some form. Otherwise you would not eat because someone should first prove to you that the food is actually there. In a number of cases, then, we trust our own judgment and grab the slice of bread, which existence we hold for true as long as our expectations about it are not countered.

Now food taking may be an obvious case in which accepting your own authority in properly perceiving things may be reasonable. Yet, in verifying other people’s stories, hypotheses, historical accounts, or explanations of why things happen, the task is much harder. When you hear a news story and you start to reason back by asking “Who said so?” and “How does that person know?,” you always have to take their word for it and finally accept their authority in having made the right judgments, in having given a proper account, and having observed things the way they were. Or else, you have to declare yourself authoritative enough to make an alternative judgment.

We trust and believe the parent that causes no harm and later on, even if we are suspicious, we rely on all kinds of cues that enhance our trust before we say “I believe what you say.” Such cues could be clothing, an academic degree, a reputation, or because things follow logically from a premise. Yet, that the reasoning is logical does not make the premise true in an empirical sense. In essence, the fundament of our belief system is the appeal to authority – the authority of a scientist, a doctor, a technician, a priest, or your own judgment.

However, an appeal to authority is a false syllogism (Locke, 1689: *argumentum ad verecundiam*). It is the authority of our parents, our educators, the authority of experts and the dignity of priests and professors (Goodwin, 1998) that establish our firmest convictions (“Because they say so”). Our culture tells us who

can be regarded as a trusted authority. For one culture, it is the mullah; in another, it is the Nobel Prize laureate. There are even cultural differences in authority bias. American students are more skeptic towards formal authority and less willing to accept truth through authority than Middle Eastern students (cf. Karabenick & Moosa, 2005).

One could counter that authority plays no role when we judge what is most likely given the evidence. In a probabilistic setting, however, data can only partially count as evidence. The observer then decides by the authority of his or her own judgment that one or the other possibility is most plausible according to a belief system that was transferred to her on the basis of authority (school, upbringing). The same holds in a logical setting: One should adhere to the logical reasoning system and accept the premises before the decision can be made that the argumentation is solid.

Because beliefs inevitably are based on a false syllogism of authority, they rely on credibility rather than correctness of information. So if you dress up like a doctor (credibility), people assume that you are a doctor (incorrect information). If your infected tentacle looks like a caterpillar (credibility), the bird assumes that your tentacle is a caterpillar (incorrect information). As a child, we accept such authority because without the parent there is no way to survive. You do not bite the hand that feeds you. Later on, you are used to this way of accepting the truth and moreover, you do not have the time to check and double check each and every statement that is made.

Our reliance on and acceptance of authority is so strong that we are prepared to make people suffer because an authority says so. The famous Milgram obedience experiments in which participants induced electric shocks to people ‘who deserved punishment’ could easily be repeated in the virtual world (Slater, et al., 2006). Although participants did not believe that the virtual victim and the punishment were real, their physiological, behavioral, and subjective responses to the cries and suffering of the victim were real (ibid.). That means that in spite of data-driven signals of alarm, people are ready to follow the directive of inflicting pain (they comply with the belief system of the authority), which can even be facilitated when that victim is represented as a virtual being. It is easier to kill with a screen in between.

1.7 Authority is who provides security

We accept things as true if we trust them; we trust them because they make us feel secure. Feeling secure is a most basic need. People have a fundamental need for security and safety, physiologically and psychologically (Anderson, Chen, &

Carter, 2000). Whatever you think about a hierarchy of needs but in Maslowian terms, security (feeling safe) is more fundamental than the acceptance of facts (self-actualization). All this perhaps says nothing about what truth is in a philosophical sense but it does say why people attribute truth to certain statements and not to other.

We know that people start feeling insecure when their worldview is challenged (Van Marle & Maruna, 2010) and that they show coherence-driven shifts in the evaluations of both the facts and the underlying beliefs to come to terms with the inconsistencies (Simon, Snow, & Read, 2004). Before the great achievements of science in the early 20th century, mathematicians adhered to “one logic only” (see Schechter, 2005) that was both empirically true and descriptive of the physical world. Classical logic, however, was seriously challenged by ideas of quantum and relativity. Modern mathematicians ‘shifted their evaluations of facts and beliefs’ by stating that the physical world was not knowable (a new ‘truth’) nor that they necessarily needed it to do their work (cf. Schechter, 2005). Mathematics became a thought experiment of multiple logics that perhaps did not have to follow the laws of nature any more (Schechter, 2005) but that each in their own right at least had to be consistent.

Ontological insecurity, the term is coined by Van Marle & Maruna (2010), is born out of the observation of inconsistencies in a belief system or worldview. It makes people look for authority figures who can explain to them why disturbing occurrences happen and how to deal with them. Yet, sometimes we engage in depressive mood-congruent processing, where we accept things as true in part *because* they are not reassuring and make us feel insecure. That usually happens at a phenomenological level where the disturbing occasion (‘I am afraid our new neighbor steals’) is the consequence of an unshakable premise (‘Never trust a stranger’). Even if someone does not like the conclusion on a surface level, theoretical consistency on an ontological level is more important than admitting seeing things wrong (“I hate to tell you the truth, but I know I’m right: he steals”). If depressive mood-congruent processing of truth continues and is directed at existential problems, it will probably drive a person insane.

People need security and this need seems even more important than being fed. In the late 50s of the 20th century, the ethologist Harlow experimented with the attachment-behavior of rhesus monkeys (Harlow, 1958) (Figure 1, right panel). The rhesus baby could choose between a surrogate mother that offered a soft and furry contact experience and a hard wire surrogate that carried a filled milk bottle. The little monkey systematically preferred contact comfort over lactation, indicating that who provides a feeling of security and comfort is chosen as the mother. The funny thing, of course, was that the monkey did not reject *both* surrogates; that they were not real mothers apparently was less of an issue than the

affordances that these fictional mothers provided (i.e. the feeling of security). It seems that who satisfies the most basic need is the mother (comfort over hunger), even if she is fictitious.



Figure 1. Rhesus baby prefers comfort over lactation.

In the same vein humans are prepared to accept a placebo as pharmacologically active as long as their primary need is satisfied – the feeling of being secure. The doctor is the authority who reassures us that we are or will be safe by taking (phony) medication. If all else fails, we would even accept a quack if s/he could reassure us that everything we desire, recovery from illness for example, is within reach.

Similarly humans are prepared to accept fiction (e.g., religion, scientific theory, political statements) as long as it (*quid pro quo*) sustains their most basic need – feeling safe and secure. If yet a little doubt is raised and fiction is suspected, they sometimes suspend their disbelief (Coleridge, 1817) and do not re-evaluate their observations. This is motivated by the *dissatisfaction* of needs in the here and now, by not getting what you want in reality. Or put differently, the anticipation of need satisfaction makes people accept a story that is actually fiction (cf. the escapism in Castronova, 2007, p. 7). Certain authors even claim that ‘conditional belief in fiction’ is the default setting (cf. Gilbert, 1991; Prentice & Gerrig, 1999).

1.8 Internal consistency and external contrast

Simon, Snow, & Read (2004) point out that people not only reason from evidence to conclusions but also from conclusions back to evidence, thereby adapting the data such that the ‘facts’ fit the earlier conceptualization. These authors hold that “The mind shuns incoherent representations and constructs coherent ones in their place” (ibid., p. 816). In their empirical work, these researchers found that when people changed their minds while making a decision, “the reversal of the verdict was accompanied by a reversal of the evaluation of the evidence” (p. 829). Also Thomas Kuhn argued that scientists view their data in the light of the paradigm they adhere to and that by adding *ad hoc* hypotheses, they try to defend their conceptualizations against falsification (Kuhn, 1962).

There is a tension between what we look for and what we encounter. We attempt to make our belief system internally consistent (the search for coherent theory) because in our mental world that makes us feel secure. It is reassuring,

and not disturbing. What we encounter in the physical world, however, are other theories and unexpected data that are in counter-intuitive opposition with our beliefs.

Note, however, that we repair inconsistency only when we see it, and solely in particular cases (largely, when it is salient or emotionally relevant), not generally. So it might be that we feel secure about a belief system that is actually flawed – in hindsight and according to belief.

The basic epistemic need of security is satisfied each time that incongruence between what you think and what you experience is left undetected. My parent feeds me when I cry. Because there is system to this being comforted – it is predictable and consistent, it is repeatable and controllable – people will trust that they are safe the next time something happens. Their theory of life is true, so far. The only thing they have to do is looking for confirmation. They are believers. However, if something unexpected or disturbing occurs, resulting in loss of control, the system hampers. The theory then seems false and trust in personal judgment drops (“I don’t believe my eyes”). Either the disrupting event is denied (“It can’t be true”) or the theory is abandoned (e.g., that mathematical logic would have ecological validity).

1.9 Knowledge through contrasts

Although people try to maintain internal consistency of the belief system, they understand the world through contrasts. Our eyes have so called photoreceptor cells, which are interconnected through hardwiring. When light shines on one cell, the activity of neighboring cells is suppressed. This increases the contrasts in the observed light patterns and improves the detection of shapes (Hartline & Knight, 1974). Slight differences between the images projected onto the retina are used to extract depth information (Stevens, 2001, p. 185). If the rods and cones of the human eye are overexerted, they need a rest to recuperate. When the cells are exhausted, we actually perceive the contrast color. Pounding a drum is nothing but constantly turning sound on or off. Hearing sounds only works because the tiny hammer bone ticks on our eardrum: on-off, on-off. On a completely different level, the degree to which people are satisfied about their lives surely depends on positive experiences but *in contrast to* the negative experiences (Cheng, 2006).

What science attempts to do is to find a general theory, rule, or ‘law’ that explains all diverse phenomena. The fewer assumptions you make to formulate the rule, the better it is (the theory is parsimonious). And although it is a general rule, it has to be specific about what is explained and how that works. Due to that demand, it should exclude other phenomena and rules. Thus, within a scientific

way of thinking, there can never be one formula of the complete universe. There have to be at least two, which can be supplementary. By definition, “God is all” or “Everything is related to everything” is non-scientific because these statements, although general and concise, are non exclusive (apart from being unverifiable). Because to an extent theories or rules exclude one another, science thinks in terms of contrasts, oppositions perhaps, and is always open to discussion – there are at least two options, always. Things can be there or not, conditions are on or off, hypotheses are confirmed or refuted.

In other words, contrasts solve the problem of vacuity in hypothesis generation. The paradigm of vacuity that “All is one” should be contrasted with a divergent thought such as “All is differentiated” to make a start in becoming informative. Creating contrasts and oppositions does not necessarily simplify the world. The flip-flops in digital circuits are switched on or off and with that simple mechanism, extremely complex structures can be analyzed or produced. The general rule provides internal consistency; the alternative rule – even if it is fictitious or plainly wrong – provides external contrast.

1.10 Contrasts help adapt to change

The understanding of the world through contrasts is important when adapting to change. If the belief system is rigid, things that fall outside the scope of that system cannot be understood. In a rigid system, events that are not predicted cannot be there. But because most people *do* understand that something has fallen outside the system, they implicitly acknowledge the existence of another rule. If they are willing, they do have the possibility to adapt, and hence, to adapt their own system. This way, we can deal with events that we never encountered before. Yet, we tend to ignore the fact that holding on to a theory implies the existence of another theory. On the one hand, the inconsistency confirms the existence of the system; on the other, urges us to doubt it (do you keep the faith or not?).

Switching perspectives or so called divergent thinking (e.g., Csíkszentmihályi, 1996, p. 60) is important not only to maintain but also to renew a belief system. Divergent thinking is a prerequisite of creative thought because it draws in remote domains of knowledge that appeared disconnected at first (Hoorn, in prep.). When situations change and the familiar beliefs do not hold any longer, thinking divergently helps to create innovative solutions, which provide new meaning to the transformation.

1.11 Challenging the contrast approach

There is also a counter-movement, coming from philosophy and literary criticism (e.g., Derrida, 1967), that challenges the contrast approach. Science attempts to explain complexity by making up less complex principles (the rule, the 'law'), which have to imply contrasts because otherwise they would not be exclusive. The literary critics, however, claim that dichotomy, opposition, and exclusive rules are arbitrary (Lamont, 1987, p. 590). They are human-made concoctions. Instead of focusing on the average trend, these scholars want to explore the full of the variance, 'the complexity' they would say, 'the data space that is described by another rule,' the scientist would counter. The approach of these philosophers and critics then is exploratory and not explanatory, which is fine if you want to discuss all the ins and outs of a single work, such as a poem or an essay. As soon as you go beyond a case study, you have to extract the equation or come up with the function and consider all unexplained variance as counter-evidence.

In that sense, deconstruction analysis is extremely useful but its results are the denial of its very premises. Let me explain. Science attempts to formulate systematicity and structure by looking at contrasts or oppositions. Deconstruction says that such oppositions are arbitrary and in demonstrating sheer complexity, starts to meticulously search for all that runs counter to it: the biases, the flaws, the ellipses of thought (Gasché, 1987). Because deconstruction admits that nothing can be completely known, their explorations of what counters a rule is a very scientific act of looking for falsification. If there is a difference between a theory and an event, then the difference is based on an assumption of 'there is something else.' This 'something else' is an implicit theory of what is there in the world or possibly can be. If there is an alternative theory, which may be implicit, it follows that there must be an alternative explanation, an additional prediction, or an opposing rule, something deconstruction would explicitly, but not righteously, deny.

Ergo, contrasts (of which oppositions are just one form) are the way we think, even if we are deconstructionists. Contrasts provide the information we understand. However arbitrary, they need not be false. Deconstruction thinkers are like pilot fish: They clean the skin of the shark and confront science with its inconsistencies. And the shark says "Thank you, I have to come up with an even better rule." Note then, that pilot fish are all black and white – two opposing colors unified in one fish, so to speak (Figure 2).

Figure 2. The White-tip shark of science serviced by the pilot fish of deconstruction.



The irony is that if people have a theory about the world, or a rule of conduct, however implicit, there must be an alternative as well. Contrasts are the way we think but we are prepared to postpone their mutual confrontation, ignore the alternative for a while, and suspend the disbelief in our own theory. Why?

1.12 Confirmation and falsification

Testing our thoughts by touching, hearing, and seeing is similar to the empirical cycle of hypothesis testing. The more often this empirical cycle between sensory input and conceptual mindset leads to confirmation, the better the need for security and safety is satisfied. In a Popperian sense, that would not count as a scientific procedure because there is no focus on falsification of the hypothesis. In a psychological sense, however, it is exactly what people do, even when they are scientists. Sokal and Bricmont (1998/1997, 62f.) explain that scientists will think their theory is better, their hypothesis more acceptable, when it withstands attempts of falsification. They argue that science always progressed through the success of a theory, not through its failure – although personally I find failure just as informative as confirmation. Thus, people (scientists and myself included) have a positive confirmatory bias each time a hypothesis is supported and they will attach greater likelihood and higher subjective probability to it (cf. Sokal & Bricmont, 1998/1997, 62f.). Based on such seemingly reliable ‘historic’ information, people put trust in future situations.



Figure 3. An inconvenient truth. “What gets us into trouble is not what we don’t know. It’s what we know for sure that just ain’t so.” Al Gore cites Mark Twain.

Yet, a positive confirmatory bias does not mean that the contents of the hypothesis need to be positive. In maintaining theoretical consistency (Section 1.8), negative outcomes of a firmly held belief may still count as confirmation and hence induce a sense of security on an epistemic and ontological level (“I know I’m right in saying that the world is bad”) (cf. depressive mood-congruent processing). As long as the (negatively-laden) theory is confirmed, the ‘inconvenient truth’ about it is reassuring (cf. Figure 3). Confirmation of negative conceptions about the world merely indicates that “I see things right,” that “nobody fools me,” that “I know the world,” and that “I am able and can cope.” People who cling to a theory (believers) are in more need of security and reassurance than self-skeptics, I guess.

Considering evidence as confirmation or falsification merely indicates in how far you are a believer or not. Let me give you an example. If you accept evolution as the mechanism that explains biological diversity, the missing links in a range of transitional fossils just means that we have to look harder – do more empirical research. If you accept intelligent design as explanatory framework, the missing fossil may count as falsification of evolution theory. If we read a fairy tale of fauns and unicorns and someone starts to travel the Highlands to look for these species, why would s/he be mistaken? Not finding it may merely indicate that we have to look harder – do more empirical research. Evolution theory does that too. But if we do not believe in unicorns in the first place, not finding it proves that we were right and that those who believe in fairy tales are wrong. That is how intelligent design would see it. Now what if evolution theory in fact is a fairy tale and that missing links are unicorns? Will the National Academy of Science order another expedition into Africa? What if the church is wrong and waiting for the Messiah is waiting for a unicorn? The preacher would say you have to look harder, do more inner explorations to find faith inside yourself.

So if you believe in evolution, intelligent design, or fairy tales, your approach to knowledge is to look for confirmation. Inconsistencies just need more work (e.g., an expedition into Africa, deeper inner contemplation).

On the border of France and Switzerland, a multibillion dollar Large Hadron Collider was built to find the Higgs boson, a hypothetical elementary particle. Yet, with such so called “virtual particles,” anything a person can conceive of happening, can occur (A. I. Miller, 2000, p. 402). The particle can be there and not, all at the same time (*ibid.*). Building the biggest machine on Earth may result into building an even bigger machine because the unicorn could not be found. If you oppose to a theory, you focus on falsification and all that is in favor you frame as mere coincidence or the result of human construal – as I just did.

But what if you suspect that two conflicting theories can both be true? My colleagues at the Laser Centre tell me that within the common quantum-field rules, explaining Einsteinian gravitation would lead to physical quantities being divergent. Both theories run into infinities that are not experienced in the physical world. Quantum field theory on gravity seems to be conflicting with general relativity. It cannot be applied to, for example, electromagnetic fields without running into infinities. General relativity falls apart when it tries to describe the extreme situations in black holes and the Big Bang.

As I understand it, only by a more philosophical approach rather than a mathematical or experimental substantiation (Box 2), that is, by adapting the fundamentals of the scientific belief system, can a quantum theory of gravity be made ‘true.’ When I returned with this message to the people of the Laser Centre and

Box 2. Quantum and relativity

The main reason why quantum theory and general relativity cannot be combined in their current forms is because quantum theory is a background-dependent theory and general relativity is background-independent. The incapability of physics to produce a combined theory of Quantum Gravity that is falsifiable has led to a gap between theory and experiment that is unprecedented in modern physics (Smolin, 2007).

Certain people try to solve the discrepancies mathematically (e.g., Hadley, 1997) but no one has been successful yet. Now what? Should relativity or quantum theory be adapted, or both? It is likely that both theories are nothing but non-perfect indications of an even more fundamental theory. Some physicists believe this situation might signal a radical change in scientific research and that some theories might not be testable! There might also be a solution in slightly adapting the special theory of relativity (which concerns the speed of light) while leaving the general theory of relativity and quantum theory intact. Smolin (2007), for instance, argued that our understanding of quantum mechanics is wrong as is our understanding (if any!!!) of time.

Avenues that are being explored to solve the quantum-relativity problem are to make quantum theory background independent, to take causality as the primary fundament while using twistor theory (where events are primary and their relations secondary), to use non-commutative geometry ($AB \neq BA$), or apply so called Loop Quantum Gravity, where fields are described as lines, and space and time are a consequence of putting together quantum theory and general relativity on that basis.

suggested that all fairy tales may be right and that all science may be wrong – they had a good laugh and kindly showed me the door 😊.

1.13 Believers and skeptics

If inconsistency occurs, there are two ways to go about it. If you are a concept-driven person, you will be a strong believer and say that the sense perceptions should be doubted and that the measurement was wrong – you call it fiction. If you are a data-driven person, you are a skeptic of your own theory and say that the concept was wrong and the sensory input was right and you will call the inconsistency reality. If initial believers are disappointed by the data, they become skeptics. They start looking for more falsification when they are empiricists or do deconstruction when they are phenomenologists, which reassures that the old view is wrong and that new theory is urgent.

Because it is hard to leave an earlier viewpoint and admit that the trust you put in your beliefs was misplaced, it may come as no surprise that humans are conservative in nature (“Keep what you got,” “Know where you stand,” “Look twice before you cross”) even if this implies the preservation of suffering. Not knowing what to expect is more frightening than known sorrow. There will be a

change only if a leader stands up and frames the new horizon as not threatening without disqualifying the current view. Such a leader takes on the role of the parent who encourages the child to go where it did not dare before (“Go ahead, you can do it, nothing will happen. It’s okay”).

1.14 Is it all in our minds?

As a student of semiotics with professor Alexandrescu, I once had a friend who strongly believed in deconstruction. He took it to the extreme and claimed that systematic explanation and mechanisms that govern the world are non-existent, a fiction; that we were looking for a unicorn. He argued that the only thing a scientist could do was to scribble notes in the margins of the world’s phenomena, comment on the way our conception of reality unfolds. Although I strongly agreed with him that all we know is a construct in our heads and that it is theoretically impossible that we ever know that our knowledge is complete, I also told him that humans are capable of seeing things more-or-less in the same way, that we can change perspectives, and that we can detect (or construct) systematics that – however imperfect they may be – help us survive. Our imperfectly created systematics can help us improve our lives by complying with them (I urged him to stop smoking) or fighting them (I told him to go to the doctor to treat his pneumonia).

One day, after a heated discussion because he refused to visit the doctor, I told him to go lie in front of a truck and see if he would run if that truck pulled up. As he died while being run over, I decided to take the empirical stance: Assume a systematic and test it with my own hands, eyes, logic, senses, and assume that we can predict cause and effect up to a certain extent. If the truck pulls up, you die. That’s the rule, no matter how you comment on it.

1.15 Is it all in our hands?

If it is not just in our heads, how far then can we trust our hands? The assumption of a cognitive-empirical stance is that the more concrete something is, the higher the probability that it really exists. Yet, must something be concrete and empirically testable to be real? There may be things out there we do not know because we do not have the proper instruments to detect them. They could be God, a unicorn, or the spontaneous creation of matter in vacuum (Milton, 2004). The test of the theory only goes so far as our measurements allow us to. How do we know what we know? It is just a guess, I suppose, something we are used to trust because it has never failed... so far. So what is it that we trust in ourselves such that we assume something to be real? What is it that we trust in ourselves to think that an

abstraction is true? Abstractions are hard to demonstrate empirically. Internally consistent, yes, ecologically valid, who knows?



Figure 4. The Assurancetourix complex: ‘I am a genius, the others are barbarians.’ (Goscinnny & Uderzo, 1967, p. 8; see also Goscinnny & Uderzo, 1972, p. 48)

What is concrete and real is based on individual sensory sensitivity and on individual beliefs about what touch is, smell is, and how that relates to the concepts in our minds. And then there is the option of being wrong, being mistaken, and of making errors (the shift between reality and fiction). The possibility that fiction is taken for reality or reality for fiction allows other believers to convince you that what you felt or tested was flawed – reinforcing the mainstream concepts; it makes you hold on to the old theory. It also allows you to believe that you have extra or special skills and senses (the others are wrong, Figure 4, Box 3) – adapting the conventional view to your new experiences. Creative people who believe in different things than you (great scientists, spiritual gurus, prophets, visionaries) could convince you to change your concepts – which forces you to reframe or reinterpret your sensory input. Non-believers do not exist. They die because they cannot act. It would mean that they have no concepts of the world and that their minds are blank so there is nothing to act upon and nothing to work towards. They would not reach out to eat a sandwich.

Box 3. Never argue with a fool

Not only (self-acclaimed) geniuses may convince you to abandon your convictions. A society can do so out of free will to accommodate a significant other or to humor a sad person.

In *Lars and the Real Girl* (Gillespie, 2007), the socially impaired protagonist buys a hyper realistic sex doll on the Internet and treats her like a real girlfriend. The sister in law and the physician tell the village people to accept the situation because the boy is happy this way and does not do any harm. Decently dressed, the doll goes to church with the family and is eventually adopted by the conservative Christian community.

Sometimes, people go along with a fool in order not to upset him. Sometimes that fool is your boss, sometimes a family member, sometimes a political leader.

2. What fiction is

In this section, I would like to offer a conceptual framework to discuss fiction, reality, realism, and related notions. The first outline of this theory was written down in Hoorn, Konijn, and Van der Veer (2003). I will emphasize the importance of distinguishing the artifact that carries the fiction from the fiction itself, which is information coming from other sources than one's own experience. I also want to stipulate that what fiction refers to in part is void of referents that exist according to the perceiver's own beliefs. Then I will argue that the division between fiction and reality foremost is a concept-driven action, sometimes blurred by data-driven input. After that, I attempt to describe the relation between judgments of fiction, the attribution of truth, and the perception of realism.

2.1 Separate the artifact from its contents

The physical, empirical, world is represented in our minds as 'reality.' In the physical world, we have first hand experiences that refer to existing things, which we call reality. These direct experiences may be highly fallible or sometimes even illusory but we have nothing else to go on. Part of that reality consists of artifacts that put up a fiction, such as books, cinema, text messages, life stories, or journal articles. They carry information that – by definition – is mediated: Information that comes to us through other communicators. It is second-hand information and an indirect source of experience for the receiver. "It's all invented," Zander and Zander (2002, p. 12) state and there is nothing bad about it, they say. It is the way people construct their realities and their life stories. The artifacts that carry or transmit the fiction (the play, the picture, the spoken words) are not fiction themselves but rather all the information that is transmitted and/or the things that they refer to are fiction – even if some of those things exist in the physical world.

Thus, fiction is never concrete. It is information that comes to us indirectly, through the mediation of another communicator. If we cannot verify this information through direct experience, it remains fiction irrespective of its truth claims or the authority of its source. It follows then that someone can have direct experience of a play as an artifact, which is *not* fiction, but not of the play as the entities it refers to, which *is* fiction. It also follows that if someone only has heard of things that are real, these things remain fiction if verification through direct experience does not occur and as long as that person trusts his or her own observations.

When you open a book and read about a character, the book as an artistic product is part of reality and so is the existence of the story. However, the world

and the character that the author wants you to believe in are fictitious. When you open a newspaper and read about a person, the newspaper and the existence of the story are part of reality but the world that is conveyed and the people that it presents are perhaps based on reality but they are fictitious as well. They are the rendition of an existing character, an interpretation of a real person, they are mediated people; you did not become aware of their characteristics through your own direct experience – you got them second hand, from someone else: the writer, the journalist, the scientist, the doctor, your neighbor. The same applies to theater. The actor as a performer is a real person but the character s/he portrays is fiction. The character exists in real life as a portrayal, that is, it exists as a creative product. The talk-show host as someone who works for television is a real person but the TV personality s/he is on camera is a staged character. The caterpillar of the hawk-moth butterfly is real (see Introduction); that it is a snake is fiction; that it wants us to believe it is a snake is real.

Thus, it is extremely important to separate the artifact that carries the fiction from the fiction it puts up, that is, from what it pretends to refer to or pretends to be. The actor is not the character and the president quoted in the newspaper is not the real person. Works of fiction are part of the physical world; the contents they convey and how you interpret these are part of the mental world.

2.2 Information not personally verified remains fiction

Works of fiction only partially point to things that are ‘out there’ once you test them in the physical world, try to see them with your own eyes, touch them with your own hands. Certain works of fiction such as a scientific model may point to more things that really exist than, for example, a Sci-Fi novel. In other words, all kinds of elements in a work of fiction (e.g., fauns, mermaids) refer to things that are void of reference – they are not backed up by things that you think are real. You just project something there; imagine something existent to fill out the blanks (a hybrid between man and goat, between woman and fish). As a phenomenon, then, your interpretation of the contents of a work of fiction is existent but it refers to something that is at least partially and sometimes even completely void, to something that is missing in the world (according to your own belief system) but that you can fill in yourself. If someone states that there is truth in art, then that person conveys that s/he believes in fantasy and that s/he tried her imagination hard to find existing people and situations to fill in the – in principal – void references.

When someone thinks that in his or her view, a story refers to non-existent things such as flute-playing fauns; he realizes that fiction has at least in part an empty reference. Fiction challenges the belief system because it asserts that

temporarily we have to accept that flute-playing fauns really do exist. This challenge may be mild perhaps, but it does test the beliefs.

Therefore, when recognized as such, works of fiction are – deliberately or not – ways of putting up inconsistencies that try a belief system. A newspaper item does so by adding new ‘facts,’ insights, and perspectives to our knowledge base, which is hardly disruptive; a scientific revolution (“the world is not flat”) does so by turning our belief system upside down, which is highly disruptive.

2.3 The categorization of fiction and reality

In the previous section, we saw that information pending personal verification should be considered fiction provided that one trusts enough the authority of one’s own judgment. Yet, the latter is the weak spot of knowing. We are brought up while being told what is real, what to expect, who is right, who is wrong. There are many fields we have no direct access to and with this inaccessibility the trust in one’s own authority drops. Because fiction in part refers to things that are non-existent, they evade access and can hardly be verified, which mitigates the trust in one’s personal authority. We start looking for priests, lie detectors, cultural connoisseurs, and other often self-acclaimed authorities who will tell us right from wrong, science from superstition, fiction from reality. In other words, all the things we have seen or heard about have a more-or-less tentative label, saying this is fiction and that is reality.

Resting on a series of impressive studies in the 1970s and 80s, Rosch and her team concluded that people do not rely so much on abstract definitions of categories but rather on a match between what they observe and an entity (object, event, experience) that best represents a certain category. Translated freely, people do not have a fixed definition in their heads about what abstract painting is but if they see something that looks like a painting of which they have heard it is ‘abstract,’ they conclude that the painting at hand also is ‘abstract.’

Rosch (1999/1978, pp. 190–191) provides a layout of categorization that also applies to the division between fiction and reality. She proposes two principles, that of *cognitive economy* and that of *perceived world structure*. Cognitive economy asserts that it is easier to think and talk about groups than it is to discuss the ‘infinite differences’ of each individual member. Generalization that is based on a common feature is a form of data reduction, which is cognitively efficient, saving time and effort. Differences between group members, then, only need to be discussed when they become relevant to a certain purpose.

Perceived world structure is a categorization principle, stating that in our perception, the physical world consists of co-occurring features and thus has a highly

correlational structure. In our perception, the co-occurrence of features is not equiprobable; as Rosch puts it, “wings co-occur with feathers more than with fur.” Thus, some combinations of features are more likely to occur than others because we have empirical or logical evidence for that (Rosch, 1999/1978, pp. 190–191).

Applied to our discussion, cognitive economy implies that it is undoable and in many cases not useful to contemplate the reality of all the features of all the entities we encounter in the physical world. It is more efficient to think in terms of things that we were taught are fiction (e.g., novels, films, virtual reality) and things that are not (e.g., journalism, science, daily experiences). Thus, cognitive economy would have it that if you read a novel, you conclude that it most likely describes ‘fiction.’ If you read a newspaper article, it most likely describes ‘reality.’ As Rosch indicated, such categorizations are clearly dependent on the category system that is already existent in a given culture (Rosch, 1999/1978, pp. 190–191).

However, such preset conceptions can be derailed and this is where the next principle enters, namely the perceived world structure of features that co-occur at unequal probabilities. Feathers are strongly correlated with wings and wings with birds so that the perception of one feature (feather) leads to the association of ‘bird.’ The duck-billed platypus, however, is an egg-laying mammal, a categorical hybrid to human perception, because it combines a flat beak with fur and eggs with lactation. From a data-driven perspective, seeing a platypus for the first time acutely challenges the culturally set category system. The combination of duck beak with fur has a low probability of occurrence but the empirical evidence that is encountered seems to be serious yet drives at two different categories for one entity. Should you believe your own eyes? Many art forms, creative ideas, and

Box 4. When fantasy becomes believable

The National Geographic Channel documentary *Extraterrestrial* (2005) showed what life forms space scientists, biologists, and ecologists from NASA and SETI imagined being possible with different atmospheres and gravities than on Earth. Based on fictitious parameters, these scientists made serious calculations what evolutionary might be possible. Figure 5 shows an artist impression of giant ‘skywhales,’ spanning 33 feet. The whales can fly if a planet had low gravity and an atmosphere three times denser than Earth’s (Retrieved Sept. 21, 2007 from <http://news.nationalgeographic.com/news/2005/05/photogalleries/aliens/>). For a number of convincing video clips, see <http://channel.nationalgeographic.com/channel/extraterrestrial/index.html>.

Figure 5. Alien creatures in virtual worlds. Serious predictions of extraterrestrial life based on different parameters than Earth’s (Big Wave Productions Ltd.).



fictional devices obstruct the principle of cognitive economy by offering a differently perceived world structure of features that co-occur at unequal probabilities such as men and goats that become fauns and women and fish that become mermaids (also see Box 4, Figure 5). As Rosch claims, the structure that is perceived in the physical world has implications for the level of abstraction of categories formed in a culture (Rosch, 1999/1978, pp. 190–191).

2.4 Epistemic appraisals

With regard to the categorization of things as fiction or reality, this book deliberately goes against cognitive economy and the conventions it produced. I agree with Rosch that people apply cognitive economy as a psychological heuristic and that this is pragmatically useful, but, when using the heuristics as such as a tool for the analysis of fiction, its results give rise to mere confusion.

We saw that the culturally conveyed fiction-reality categorization can be challenged by data-driven perceptions, which lead to what Hoorn and Konijn (2003) termed “epistemic appraisals,” an estimate of the amount of realism perceived in a stimulus. Whether supporting or obstructing the fiction-reality judgments, epistemic appraisals are focused at the local features of the observed entity (feather, fur, duck beak, eggs, goat’s horns). Features may show a degree of similarity with features that exist in the physical world: They are ‘graphic copies of something practically real ...’ (Adorno, 1982, p. 198). Therefore, features are partially ‘true,’ irrespective of whether they belong to the observed entity or not (e.g., a bird with a tiger’s tail). From a global point of view, a bird with a tiger’s tail is a fictional creature but locally, its features are more-or-less realistic. The combination of the bird’s and the tiger’s features is false but the features seen as entities of their own are true. Note that what is seen as an entity or a feature thereof is, according to Rosch, based on our culturally defined categorizations (concept-driven) as well as on Gestalt laws of good form that would help interpret data-driven input as separate parts of a larger entity (Rosch, 1999/1978, pp. 190–191).

Thus, the epistemic appraisal of local features leads to a level of perceived realism. The establishment of perceived realism is a background mechanism to check the automatic classification of something as fiction or reality and becomes highly active once that classification goes wrong.

Similar to the typus example, the features and behaviors of a fictional being can be so realistic that data-driven processes overpower the conceptual classification. For example, the Aki Ross character in *Final Fantasy: The Spirits Within* (Sakaguchi & Sakakibara, 2001) is completely computer-generated but that is done so realistically that you sometimes have the feeling a real girl was filmed

Box 5. When reality becomes unrealistic

On April 5, 2008, two-faced baby Lali was born in Saini Sunpura, India (Figure 6). She suffered from craniofacial duplication, which means that she had duplicates of everything in her face except for the ears. By the locals, Lali was believed to be the incarnation of Durga, the Hindu goddess of valor (Associated Press, April 8, 2008).

In the West, the concept-disrupting observation of a two-faced girl was perceived as 'unrealistic' but disbelief was restored as reality because it was scientifically framed on the far side of what is possible ("it's a disease"). In India, the same disruptive observation was framed in a different belief system, as the incarnation of a double faced goddess of courage. For us Westerners, that is a fiction. Yet, the inkling is the same. We reframe the concept-derailing observation as something rare and give it a term that may be reassuring but what it means we actually do not know. We leave that to authorities such as priests ("Durga") or scientists ("craniofacial duplication").



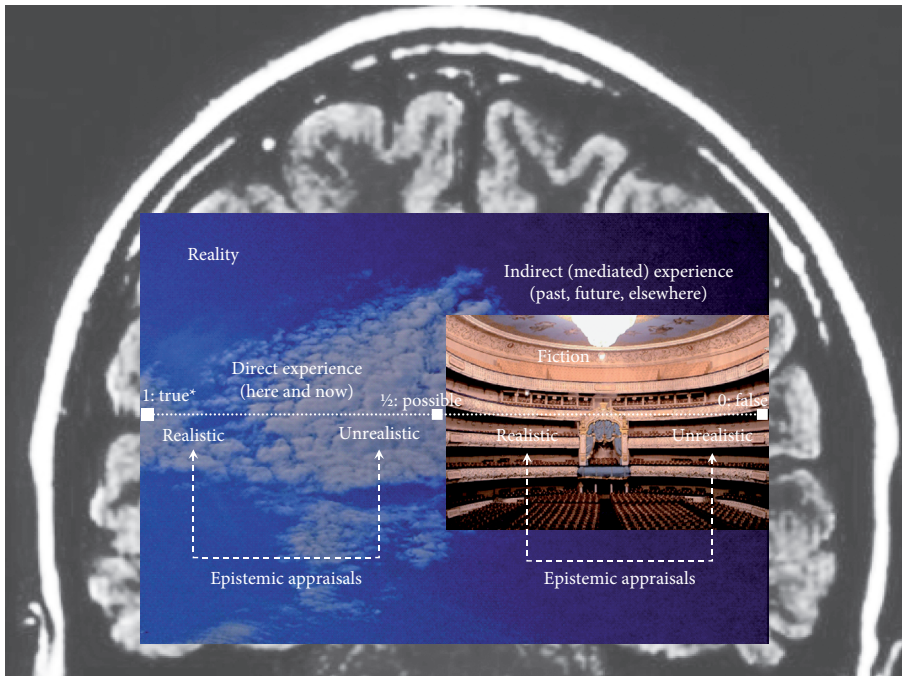
Figure 6. Craniofacial duplicate regarded as Hindu deity.

(also see Box 4). Reversely, an event in the physical world may have such extraordinary elements that we are inclined not to believe it (Box 5). The level of perceived realism may urge people to beat up an actor for the character that he plays (e.g., Larry Hagman who played J. R. Ewing in *Dallas*) or think that bizarre facts are nothing but a bad dream (e.g., 9/11).

In sum, fiction-reality judgments are mainly concept-driven and culturally bound. They are global judgments of a categorical nature. Based on the religious, cultural, or scientific belief system that, with an appeal to authority, tells us what is true or false, we consequently decide that an observed entity is fiction or not. Data-driven perceptions sometimes challenge that categorization and many creative products do so by combining features and domains that have low probabilities of co-occurrence in what we consider to be reality. When fiction and reality are confused it basically means that you have put an item into the wrong box.

2.5 The fiction-reality framework

Figure 7, then, starts from the main assumption that the physical world is out there, it exists, we experience it first hand in the here and now, but it is hard for us to get an understanding of it due to our imperfect measurement tools (i.e. our sense perceptions). Therefore, the reality we work with is a representation or (imperfect) construct in our minds. Because one way or the other, our mind is connected to the physical brain, Figure 7 shows a background picture of a brain



* Note: Attribution of truth according to subjective belief system or world view (e.g., scientific, religious, or cultural).

Figure 7. The relation between the attribution of truth, epistemic appraisals, and fiction-reality classification.

scan in which the mental representation of the world is placed (a blue sky with the word Reality). A second main assumption is that works of fiction are part of the physical world. Indeed, novels, theater, games, and lies exist as part of everyday life (we experience the artifact in the here and now) but what they convey is mediated, symbolic, second hand, what they refer to is at least partially empty, refers to the past, the future, or another place, and needs to be filled out by our imagination, world knowledge, or experience. Thus, what we call Reality encompasses a segment that we call Fiction (Figure 7). We regard as reality what refers to existing things that are often directly observable in the physical world; we call fiction what refers to (partially) empty things that are often indirectly observable, for example, when a medium such as television is involved. ‘Truth’ as an array of probabilities instigates the classification of something as fiction or reality at a global level. It is an ontological verification of category membership (‘It’s a bird’). The closer truth values approach scale midpoint, the stronger people focus on the attribution of

Box 6. Paintings do not lie but painters do

The fake Picassos by Geert Jan Jansen or Van Meegeren's 'false' Vermeer paintings are a fine example of painters who lie (Figure 8). Whereas Vermeer was an artist but not a liar, Van Meegeren (1889–1947) was an artist and a liar. The paintings were pastiches ('Vermeegereens') that the artist lied about, making him a con artist but it did not make the paintings false. Yet, because of the moral misstep of their creator, not only the artist's claim but the paintings also were qualified as false, and therefore, rejected, mixing up that not the paintings were the artist's lie but that the artist lied about his paintings. That all art experts were fooled did not help either to sidestep this mistake.

The film *Lart de l'Imposture* by Laurent Préyale (2002) offers a nice overview of apocryphal works, copies, pseudonyms, plagiarism, and pastiches. Another nice example of an art hoax is *Modigliani's Genuine Fake Heads* by Giovanni Donfrancesco (2011), Altara Films.

Figure 8. Van Meegeren's *Woman Reading Music* (1935–1936) is regarded as fraudulent art: fiction qualified as false.

truth via local features (epistemic appraisals: realistic-unrealistic), affecting the reality-fiction classification.

Although represented pictorially as a dichotomy, the overall distinction between Fiction and Reality in Figure 7 is not that crisp. On the most basic level, a continuum of truth values crosses right through these two main categories, making their boundaries fuzzy. In other words, the human mind works through contrasts and oppositions but these contrasts can come in many different degrees (cf. color contrasts). There are things we believe are absolutely true. In Figure 7, these assumptions are placed at the far left of the truth continuum. We are absolutely sure about these things and in our view, they belong to what we consider the physical world.

At the far right of the truth continuum, there are things we absolutely know are false ("It's what we know for sure that just ain't so"). All that we deem 'false' belongs to fiction, be that a lie, be that a misconception, be that the vision of a false prophet. Literature, theater or art in general is in the fiction domain but is not 'false' as long as it honestly admits that what we observe is pretence and make-belief (cf. Chapter 3, Rule 3). If art tries to hide that what it presents is pretence, art is considered a lie and therefore, false. Again, truth claims and moral judgments always go hand in hand (Box 6).

In being based on a firm belief system, the attribution of either 'true' or 'false' is a concept-driven way of looking at things and strongly establishes a sense of being in reality or not. In between is the tricky bit. Here you find all the things that

possibly could be true but perhaps are not (left of scale midpoint) or all the things that can impossibly be so but you never know (right of scale midpoint). Fundamentalists will avoid that middle ground. They have a two-valued logic of either true or false. You can imagine that a deconstruction thinker can never be a fundamentalist believer. For the fundamentalist, the pictorial representation of reality and fiction in Figure 7 is correct: Fiction and reality are clear-cut categories. For all other people, the absolutely true and absolutely false probably do not exist. These people apply a multi-valued logic of things that may be extremely probable or extremely improbable but there will always be room for doubt (“Maybe,” “Perhaps,” “Possible,” “Plausible,” “Probable”) (cf. the plausibility criterion of Green, Garst, & Brock, 2004, p. 170).

The concept-driven attribution of truth at a global level leads to the classification of the thing as a whole as Fiction or Reality. I will call this process *ontological classification* because it checks the coherence between what is believed about the world as is and the world as perceived right here and right now. At the heart lies an instance-category match. I see a robin while I walk outside where I know birds like this exist so the sensory impression of the robin is classified as ‘Reality.’ I see a red-nosed person and I am in the circus where I know that people act like clowns so that the sensory impression of the clown (not the actor) is classified as ‘Fiction.’

The data-driven attribution of truth to local features I will call *epistemic appraisal*. This process may interfere with the ontological classification. The belief system tells us whether something is true, but it can do this for the entire object (unicorns do not exist) or for the local features (horses exist, horns exist). The global judgments guide our ontological classification of something as fiction (“probably not” to “false”) or reality (“probably yes” to “true”). The data-driven, feature-oriented epistemic appraisals lead to judgments of realism. Highly realistic details in a fiction story draw the story from plainly ‘false’ into the realm of ‘probably false.’ The story comes close to reality. Epistemic appraisals that lead to a high degree of perceived realism can heavily interfere with the fiction-reality distinction (cf. Potter, 1988).

As Figure 7 shows, epistemic appraisals can be applied to things we think are part of reality (our direct, unmediated observations) and to things we regard as fiction (our indirect, mediated observations). It has a local orientation and could basically compare each feature that is observed about a person or object with what is stored in the head – wherever that comes from or whatever it belongs to. The instance-category match that is at the heart of the ontological classification is more of a quick-scan whether something roughly fits one of the known categories. Ontological classification follows Rosch’s “cognitive economy” principle (Rosch, 1999/1978, pp. 190–191). Epistemic appraisal follows Rosch’s principle of “perceived world structure” but allows that features can co-occur with different

categories or that they have multiple memberships in different sets (duck beak belongs to duck and platypus). Moreover, epistemic appraisal reckons with features that do not fit in with the category. Hence, *epistemic appraisal can match features irrespective of their membership to a category; ontological classification always stays within the category. Epistemic appraisal is meant to verify truth, ontological classification to confirm truth.*

During epistemic appraisal, you compare a person you see in the physical world with the earlier images you stored in your head (the beliefs you have about him or her). Or if it is your first acquaintance, you compare that person to what you believe a prototypical human looks like. Or if you do not have a prototype available because you have never seen such thing, you compare it to its nearest neighbor. People who never saw an airplane called it a big bird. If the features of the observed person fit the internal representation, these features are regarded as 'true' and each 'true' feature contributes to the level of that person being realistic. If enough realistic features are perceived, that person is regarded as a part of 'Reality' (Figure 7, blue sky). Whatever does not fit the picture of a person (e.g., a red plastic nose) is judged as 'unrealistic' and seen as a hint at Fiction. This is the epistemic appraisal of an unmediated observation as in face-to-face communication. Note that some features are more important than other. That the person has a head has more weight for the perceived level of realism than the clothes s/he wears – so what we work with is the weighted number of (un)realistic features.

If you see a person on TV, the same mechanism applies. During epistemic appraisal, you compare the image of that person to the internal representation of that person that you have stored in memory but because it is merely a TV image, some information may be missing or distorted. People know, for example, that news items present people and events as simpler, more exciting, and easier to deal with than in normal life (Adoni, Cohen, & Mane, 1984; Cohen, Adoni, & Drori, 1983). Therefore, Shapiro and Chock (2003) argued that more information retrieval from memory is needed to create or update an internal representation of the perceived TV image. We construe – to our best knowledge – what that person should look like, behaves, smells, thinks, etc. ("It looks like what I think it should look like").

We can update our internal representation of media figures by using direct experience (this fiction character is like real life) or through comparison with people or events we know or have heard of (this character is like someone I know) (Shapiro & Chock, 2003). If the features of the mediated person match the internal representation of the – partly self-shaped – features you have seen or heard about, the features of that person are considered 'true,' which contributes to the level of that person being realistic. If in a TV show or virtual world, you perceive a large enough number of important enough features that you think are realistic,

you will regard that person or event as being part of 'Reality' (Figure 7, blue sky) although analytically, that is an unwarranted conclusion (Figure 7, theater).

However, because the epistemic appraisals of a mediated perception is directed at things that we partially have to imagine ourselves and because mediated messages make use of more fantasy elements, the number of 'false' or unrealistic features necessarily has to be higher for mediated content than for direct experience. Thus, any claim that a mediated person or object is part of reality is a jump to conclusions. It follows, then, that epistemic appraisal as a process will run at a higher level of activation in fiction contexts than in real life settings; the latter will rely more on ontological classification. In reality contexts such as a meeting or in class, epistemic appraisal usually will be the background monitor that only in cases of first-encounters will become strongly activated to verify the truth of an observation. In many cases, fiction derails fixed classifications so that epistemic appraisal is always at a high level of activation to verify the truth of observations.

Irrespective of the classification of something as Fiction or Reality (a global judgment based on the attribution of truth), people state that something has more realistic qualities or not (a local judgment based on the attribution of truth) – even in fiction. If someone observes something, that something is matched with the belief system for ontological classification. If there is no inconsistency, the thing is 'true,' which leads to the classification 'this thing belongs to reality' and we assume that this reality conception correctly resembles the physical world. If there is inconsistency between belief and thing, the existence of the thing is 'false,' which deems the thing as being part of fiction. This activity is mostly concept-driven and is global or 'complete,' meaning that each feature of the thing should be consistent with the beliefs about it.

Epistemic appraisal is directed at the local features, is 'incomplete,' and is more data-driven. If there is inconsistency between beliefs and things, certain features are false whereas other features may still be true. A unicorn may not exist as a whole, but a horse exists and the horn of the narwhal exists too. The unicorn may be a fantasy creature but it is as realistic as the correctness by which the horse and the horn of the narwhal are depicted. Make the horse blue, and the level of perceived realism drops.

In other words, from a conceptual viewpoint we may think that Adorno's faun is not true (and hence, fiction), we still appraise the outer appearance and behaviors as more-or-less realistic – looking just like real life. On the street, we may come across our neighbor and think he is a truly existing person, but that he carries a red plastic nose is appraised as unrealistic and drives not him but his performance into the realm of fiction – he probably plays a clown. Genre labeling is explicitly meant to install the right mind set. If this is a novel, the publisher already gives away that the story is fiction. Otherwise, people are prepared to

go along with the story unless they get a cue that what is told is false – and feel cheated upon (see Chapter 2).

The epistemic appraisal and as a result of that, the level of realism (realistic versus unrealistic) that we perceive in a person, event, or situation may be of utmost importance when we arrive at scale-midpoint of the truth continuum, when our convictions are not that strong any more (Figure 7). When everything is possible and you have nothing else to go on (cf. Green, Garst, & Brock, 2004, p. 165), the way it looks and behaves indicates whether you are still in the real world or being snatched by the zombies.

3. Using the framework

We saw that the attribution of truth is based on the belief system people adhere to. According to the Hindu religion, Ganesh, the elephant deity who rides a mouse and sits on a lotus (Figure 9), is ‘true’ because, for example, his head represents the soul, which is believed to be the ultimate reality of human existence (Grewal, 2001). From a Christian perspective, the existence of Ganesh is ‘false’ because Christians do not believe that elephants with human bodies and four arms sit on lotuses and ride mouseback. Based on a Christian belief system, Ganesh is a fictional character. Its reference to the world of existing things is empty. That does not mean, however, that Christians would find the features of Ganesh unrealistically depicted. Ganesh’s hands in Figure 9, for instance, look much like real hands. The hands themselves do refer to the world of existing things. The trunk and the ears are realistic enough to recognize an elephant’s head. Hindu believers recognize the soul.



Figure 9. From a Hindu perspective, Ganesh is part of reality because his head reflects the soul, which is truly existent.

Epistemic appraisals (Figure 7) can support or obstruct the fiction-reality distinction. If at the party of your friend you would meet Daniel Craig dressed up like James Bond, you would have a hard time not to say “Hello James” instead of “Hello Daniel.” If features are realistic enough, they can overshadow what you know is false, that is, fiction is taken for real (cf. “perceptual immersion” in Carr, 2006; “presence” in Lee, 2004). The reverse may hold as well. If features are unrealistic enough (cf. Box 5), they can overshadow what you know is true. Reality

taken for fiction. People are not inclined to believe the jolly jester in spite of his just remarks.

The Ganesh example of a picture of a statue of a god (Figure 9) is a case of mediated communication. There is a medium (actually two) in between the sender and receiver, which is a good indicator that the existence of the person in the physical world should be taken with care. The Daniel Craig example is a case of *unmediated* communication. You expect people you talk to at a party to be ‘true’ as supported by the realistic features of their voice, gestures, speech, appearance, etc. You categorize them as part of everyday reality. However, if you had the same conversation with a person who suffers from a complex of elephantiasis and Tourette’s disease, you would describe this encounter as “Bizarre,” “A dream,” “Unbelievable,” and perhaps even as “Unreal.” Certain situations in life are “Just like the movies.” They are possible but put considerable stress upon your belief system. Therefore, the fiction-reality framework of Figure 7 counts them as unrealistic features of a person that probably really exists; the person is actually standing in front of you but you can’t believe your ears and eyes. You regard such features as unrealistic because they violate your beliefs.

Figure 10. Joseph Carey Merrick (19th century), who suffered from Proteus syndrome, commonly called elephantiasis (a). The Elephant Man (Lynch, 1980). Based on Joseph Carey Merrick, John Hurt played the character John Merrick (b).



In *mediated* communication such as talking on the phone, we enter the realm of fiction. This sounds weird. It is analytically correct, but in ordinary life we would qualify the encounter as “Reality.” We are caught in our sense perceptions to verify whether our concepts, our beliefs, do still apply. Because a medium is involved, you do not know what the medium is doing to the information and what it is not. Voices sound differently over the telephone. You cannot smell someone during a video conference. In interactive TV programs such as reality soaps, cuts, focal points, music, and other artistic devices trick you into selecting the person that should be dismissed from the program with the text message you are sending. The *picture* of Joseph Carey Merrick (Figure 10, a) does not tell you whether this is John Hurt playing the character John Merrick or not. The picture could be fraud. In the fiction-reality framework of Figure 7, therefore, talking to a friend over your cellular phone is a highly realistic experience of a mediated person and therefore, of a (partially) fictional character that probably truly exists. But you never know. It could be an extremely smart conversational software agent that

is imitating your friend. Or it is your friend's twin brother, who sounds just like him. Talking to a synthetic voice agent that helps you through a telephone menu is a more unrealistic experience of a mediated and thus fictional character that probably does not exist. As a software product, the agent exists. As a person, its existence is false.



Figure 11. Evolution, science, or collage (a, b, c)?

I have lined up the caterpillar of the Introduction with the mug shots of two of his friends to see if we can identify who is the fraud (Figure 11). Was the caterpillar actually subjected to genetic manipulation? Is that mouse with the ear on its back merely a Photoshopped collage? And the extendable body of the frog, may that be a remarkable result of natural selection? Because they are pictures and you do not have enough background information to verify the truth, your belief system hampers. Ontological classification is challenged. You merely have your epistemic appraisals to go on (cf. Fagin et al., 1995). Therefore, it is quite hard to determine whether an ear can ride mouseback whereas an elephant cannot. To tell you the truth, the caterpillar is a product of evolution but could easily be a Photoshopped picture of a snake. The mouse is a product of science but not of genetic manipulation as you might have thought. The frog is a collage of an orange peel and, indeed, a frog. Yet, the mouse is a collage as well but one in the real world, more like a sculpture or like an actor with a funny hat on. The mouse was not genetically engineered but was an experiment in plastic surgery, where surgeons put a human ear on its back to see whether the ear would stay alive (Cao et al., 1997). In terms of the fiction-reality framework in Figure 7, the depiction of the caterpillar is fiction with highly realistic features, and its existence is probably true. The mouse picture is fiction with still realistic but harder to believe features, and its existence is apparently true – I have to adapt my beliefs to be able to say that. The frog picture is fiction with unrealistic features and its existence as an orange-peel frog species probably is false. But this only holds if you take my word for it.

I called for some more family members of the orange-peel frog. Figure 12 shows two of his relatives that are both transparent. The question to you is which is artificially made transparent, comparable to the mouse with a stitched-on ear and which is naturally transparent like the glass-wing butterfly (see Introduction)? Try to find out for yourself which cues or features you use to decide that one is fabrication and the other is not.

Figure 12. Two transparent frogs. One natural, one artificial (a, b).



This is the answer the orange-peel frog gave me. Through genetic engineering, M. Sumida and colleagues created a transparent frog to see organs grow and cancer develop. This frog is carrying eggs inside (Figure 12, a). Transparency can also be natural, as exemplified by the glass frog *Hyalinobatrachium bergeri* (Figure 12, b) (Castroviejo-Fisher et al., 2007). But again, the orange-peel frog could be mistaken and perhaps I did not get it right.

4. The contours of a theory

I argued that we should clearly separate the artifact that conveys fiction from its reference to the physical world. The actor is not the character; the president quoted in the newspaper is not the real person. What you see as truth heavily depends on the belief system you adhere to *a priori* and it has a strong ethical component (i.e. good is true, bad is false). Considering evidence as confirmation or falsification merely indicates in how far you are a believer or not. The belief system is established through time. Since your early childhood you experienced that systematic, consistent behavior that is rewarding can be trusted and therefore is 'true.' This is an overgeneralization insidious in the pragmatic stance that as a child we have to take in order to survive. Ultimately, beliefs are based on a false syllogism of authority, on credibility rather than correctness of information. The appeal to authority ignores the fact that holding on to a theory implies the existence of another theory because humans understand the world through contrasts. Only if sensory input is incongruent with what you had in mind, the theory needs to be adapted or the senses need to be doubted ("The measurement was wrong"). Dissatisfaction of the need to be reassured may lead people to hold on to a fiction that promises (psychological) safety and security. This may range from watching a romantic comedy to adhering to a new world order.

There is a physical, empirical world, which is mentally represented as reality. Part of that physical world are artifacts that put up a fiction such as magazines, TV programs, games, Web sites, scientific articles. Fiction is anything that is mediated, information that comes to us second hand. The main difference is that in reality you have first hand experiences that refer to existing things, whereas in fiction, the information is mediated and/or refers to things that are (partially) non-existent. The Hindu deity Ganesh is a good example. Hands, trunk, body,

ears refer to existing things but their combination as one entity is non-existent in the physical world. It is an artistic collage, according to a Western belief system.

At the basis of all that we think we know (the mental constructs and human-made abstractions) lies a religious, cultural, or scientific belief system that, with an appeal to authority, tells us what is true or false, and consequently, what is fiction or not. However, the features and behaviors of a fictional being can be so realistic that data-driven processes overpower the conceptual *status quo*. These are the epistemic appraisals that lead to judgments of realism, which make people beat up actors or invest in subprime mortgages.

Acknowledgements

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CHAPTER 2

Enforcing the concepts

Genre labeling

“I do have a small collection of traditional SF ideas which I’ve never been able to sell. I’m known as a fantasy writer and neither my agent nor my editors want to risk my brand by jumping genre.” (Lynn Abbey)

Putting a genre label on a product of fiction is convenient to bypass the difficulties in the fiction-reality discussion. You can stop thinking because the label says what it is and you know what to expect. Genre helps to reinforce your concepts and classifications. However, the genre discussion is a mine field of its own. There is quite some confusion about the epistemic meaning of ‘reality soap,’ ‘social realism,’ or ‘virtual reality.’ This chapter treats a number of issues in genre theory such as the dynamics of genre, its pragmatic use, and its relation to schemata and cognitive scripts. In addition, it presents a reality-based genre taxonomy to overcome the inconsistencies of individual genre labels and incorporates this taxonomy into the fiction-reality framework.

1. Genre labeling

Let me start by saying that labeling itself is useful. A concept has a name and even though there are problems with the distinctions (e.g., an ostrich is sort of a bird, a shark is sort of a fish) such labels help us understand the world. Labeling is also misleading or more properly, limited to a given perspective. If that perspective is not shared, taken too strictly, or countered by sense perceptions, the discussion becomes confused.

In Chapter 1, I argued that the classification of something as fiction or reality is a concept-driven activity. We learn through education which stories should be regarded as reality and which as fiction. This ontological classification comes from the religious, cultural, or scientific belief system that on the basis of authority tells us what is true or not and therefore whether we are dealing with reality or not. The one thing that can override this classification is data-driven inconsistency with the belief system (the epistemic appraisals), but only if we think that

something might be possible and is not explicitly excluded by the belief system or a certain body of knowledge.

Genre labeling is an instantiation of the same concept-driven mechanism. It is a more fine-grained means to classify the external world in things that belong to (sub categories of) reality or (sub categories) of fiction. If a story is in the newspaper, we consider it journalism and, therefore, attach truth to what it says (Green, Garst, & Brock, 2004, p. 162). Journalism and history are genres that deal with real things, so we think. The Korean photos of the cloned human embryos (see Introduction) were not doubted because they appeared in a scientific journal. If that same story were part of a science-fiction novel, we would have deemed it fictional right from the start and we would have never regarded it as real (*ibid.*).

There is a major terminology problem that becomes visible in conventional genre labels. The usual convention is that fiction products are everything that is derived from fantasy, whereas non-fiction (documentary, science) is based on reality (cf. Green, Garst, & Brock, 2004, p. 163–164). Yet, if it is so that fiction is everything that is based on fantasy then why not call it fantasy? If non-fiction refers to everything that fiction is not, it does not say what it does refer to. Moreover, if non-fiction is merely based on reality then how much fantasy (or fabrication) is needed to call it fiction again?

This chapter deals with the importance of genre knowledge in attributing ‘truth’ to a message. If we know that something is a documentary, the information is ‘more true’ than when that information appears in a fairy tale. An important step towards a theory of fiction is to evade the confusion of terminology. Therefore, more systematic genre labels are needed. However, a number of traditional questions in genre theory (Stam, 2000, p. 14) need to be answered first so that they do not interfere with this new conceptualization.

1.1 Genres are part of the physical world – as materialized concepts

In 2006, the International Astronomical Union (IAU) redefined the word ‘planet’ and, consequently, Pluto officially was no planet any more but an ice dwarf. Astronomers from around the world were challenging this decision and the “The Great Planet Debate” conference started. No consensus on the status of Pluto could be reached; some planetary scientists emphasized the way gravity forces shape a planet; others focused on the cultural meaning of the word ‘planet’; yet others thought the IAU definition was just fine. One of the participants stated:

The debate is a great teaching moment. Whether dwarf planets are grouped together with the classical planets is not as important as the process by which scientists arrived at their conclusions. Scientists look at the same information in

different ways; there may be more than one 'answer.' Facts change. What we know now may not be what we know in two or three years. Learning to think critically and understanding how scientists organize facts to develop theories are lessons that will serve students for a lifetime. (Space Daily, Sep. 22, 2008)

Pluto was in or out of category according to definition. It would be tempting to think that a play, a painting, a book, a multimedia production, or a celestial body has features that automatically classify it as a certain class or genre. Of course, each thing has features that a person or even a machine could recognize; for example, a triangle has three edges and a circle has none. In genre theory, we call these features genre attributes.

In Figure 1, suppose that each shape is a work of art that we would like to classify. What belongs together? Based on the criterion of four edges, the square and the rectangle form a 'genre.' But based on color, the square clusters with the pale blue triangle. If we select all things with at least two edges, the square, rectangle, and both triangles match. In that case, the 4-edged shapes and the three-edged shapes are sub genres of the multi-edge super genre. Based on form, the red heart is a hybrid between the circle and the pale blue triangle but, based on color, the pink triangle is closer to the heart. Most works of art (or objects of science) are more complex than the simple shapes of Figure 1. The combined shapes in the lower-right corner represent the complexity of a work of art or fiction. They illustrate that a complex artifact is always a hybrid of simpler forms. Therefore, complex artifacts group together with other complex artifacts as a function of the attribute (or feature) that is in focus.

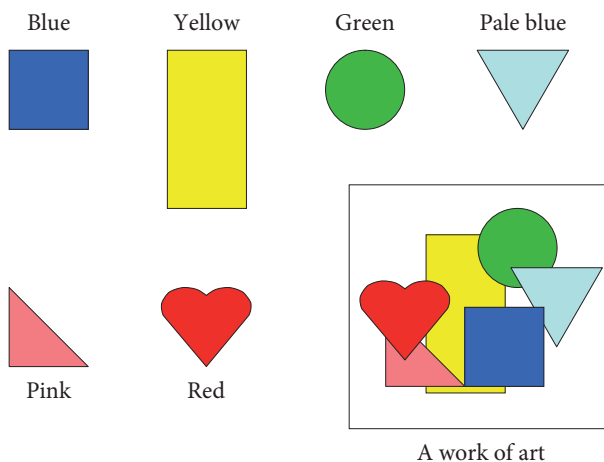


Figure 1. Genre attributes and the fact that complex artifacts are always hybrids.

Sometimes, theorists state that genre is an abstraction and not physically present in the empirical world (e.g., Feuer, 1992, p. 144). Well, that is to say. The attributes (or features) that may constitute a genre are certainly there in the physical world. They are part of the work of fiction as a concrete thing. Classical drama has five acts, Cubism has geometric forms, and romances have the word 'love' in them. How these attributes are used to group things together is another matter. It is a concept-driven activity in the minds of people and as such an abstraction. Yet, because people apply these concepts to the things in the physical world, put these things together, and build a museum, a library, a filing cabinet, a Web site, or a Great Planet Debate conference around them, genres are part of the physical world.

1.2 Pure genre does not exist, a work is prototypical for as long as it lasts

Almost all cultural products are more complex than a triangle or a circle, often-times in form but certainly in interpretation and contextualization. A Mondrian is not only a sample of colorful blocks. For example, "Clement Greenberg and Rosalind Krauss have emphasized Mondrian's idealist side, his evocation of a world of pure mind whose relation to the paintings resembles that of Plato's ideal forms to everyday reality" (in Gewertz, 2001).

If a number of works together form a genre, they are not unique with respect to the attribute in focus (the binding element) else they would not group together. But because they are complex artifacts, there are also attributes that are dissimilar and that might connect to other genres. Only with exact copies do works of fiction form a genre that has no attributes lying out. In all other cases, genres cannot be pure but have to consist of hybrids. According to Basalla (1988/1999, pp. 103–104), even the industrial reproduction of artifacts yields slightly different copies. Simonton (2009, p. 153) states that there is always something idiosyncratic to what seem identical cultural artifacts. In that case, genres can never be pure.

One could counter that perhaps the purest form of genre is the work that is unique. However, a unique book would have no attributes that overlap with another book. That book actually should not use language, otherwise there are immediately things overlapping. Perhaps, then, that the purest form of genre is established by the work that is prototypical for it. Indeed, a product can be prototypical for the genre but probably not for too long. Typicality can be determined by looking at the work that shares the most attributes with other works and that has the smallest number of attributes that are distinct. In other words, the prototypicality of a work in a genre heavily depends on the works in the periphery. If you change the periphery, certain attributes may disappear and other may appear

in the shared set of attributes. And because more products appear every day, the periphery changes, and hence, typicality changes every day.

Thus, critics and theorists may say that a work is prototypical for the genre, but it can never be so for a long time because that denies the fact that new books, films, and software applications appear all of the time. The periphery continuously redefines the prototype.

Although new products continuously are released to the market and hence change who is the prototype, people do not abandon their once acquired classifications and once designated prototypes. In being conservative to change, people preferably stay with known categories. Therefore, they may accept that the works at the edges of the boundaries change but not the older works, particularly the cultural canon. Although on the feature level, the prototypicality of canonized works most likely is changed by now; culturally, they are still put in the middle of the genre and maintained as prototypes even without having seen them, used them, or having read them. Throughout the ages there seems little discussion on medieval plays, Shakespearean plays, Greek poetry, Roman prose, what great works are, and who is a genius (Simonton, 2009, pp. XX). In my view, that is not evidence that genres are etched in stone. It also does not say that great works can undeniably be identified throughout time. For me it merely shows that people are fixated in maintaining steady classes. Through education and acculturation, they pass on such hierarchies from generation to generation. Because the hierarchy is a fixed concept, people can produce the genre without knowing all of its members and point out the prototype without ever reading, seeing, or using it. Who is the genius is taught in school. Who is not is not even mentioned anymore and thus, soon forgotten by the general audience.

1.3 Genre is culture-bound because belief systems are

Whereas the issue of prototypicality relates to the level of genre attributes, a more conceptual aspect is whether genre is tied to a (sub) culture or not. Genres are categories in terms of their extensions or sets of possible referents in the cultural domain. A lot of our categories and other concepts are acquired through acculturation (see Chapter 1) and genres are no exception to that. We work with those classifications out of cognitive economy (see Rosch, previous chapter). Because culture helps to determine the belief system, which, in turn, is responsible for what is regarded a genre and which things belong to it, my answer is that genre labels are strongly connected to the (sub) culture in which they serve. This view is consistent with, for example, Freedman and Medway (1994, pp. 1–20) and Livingstone (1990, p. 155), who point out that classifications are vulnerable to

values, norms, worldviews, and ideologies, which may differ from time to time and from culture to culture.

However, sometimes people perceive patterns across classes, including across literary or other genres, which actually are at odds with the acculturated categories. Yet, such patterns become visible only when the classifier looks at the data from a different perspective than the traditional view (cf. 'divergent thinking,' Chapter 1). New classifications may look at innate propensities and conclude that crows are songbirds or they may look at shared environmental features (e.g., sonnet and tarantella both stem from Southern Italy). Also factors such as group dynamics may give rise to conceptual development that diverges from known classes. Hodge and Kress (1988, p. 7) posit that "Genres only exist in so far as a social group declares and enforces the rules that constitute them."

In other words, there may be operational beliefs about what genres a culture names (i.e. the traditionally learned categories) versus metatheoretical beliefs about what genres are isolable in a range of cultural products, despite conventional labeling and based on one or the other pattern that is recognized or generalization that is interpreted. Note that this is akin to distinguishing between a society's medical folk doctrines and the diseases that occur in that society according to a medical doctor or other authority. At the metatheoretical level, certain cross-cultural genres may be recognized or construed that later on can become conventional genre labels as the classifier gains sufficient authority.

1.4 The number of genres is finite because the number of people and therefore the number of goals is

As we have seen, things group together differently when focusing on different aspects. Thus, there are as many classifications possible as there are attributes to focus on. Authors may want to play around with genre conventions and create unexpected hybrids (space western, fake documentary). The UK transvestite reality show *Boys Will Be Girls* (2006), for instance, is a combination of *Big Brother*, *Celebrity Rehab*, *Making the Band*, and *America's Next Top Model*.

Yet, it is not only the creator of a work who mixes genre; the observer does so as well. From a gamer's point of view, the genre may be a first-person shooter but from a technician's point of view, it may be an arcade game. Zapping behavior easily leads to blending in one genre with another. One night, I watched *Tango & Cash* (Konchalovsky & Magnoli, 1989) while at the same time *Judge Dredd* (Cannon, 1995) started. Switching between the realistic action thriller (*T&C*) and the cartoonish science fiction (*JD*) was not disturbing whatsoever. In my mind,

they became one movie. Interrupted storylines and mixing realistic with unrealistic scenes were compensated by Sylvester Stallone in the lead role and by the eternal theme of good guys chasing bad guys. Apparently, script doctors and set dressers need not worry too much because zappers create their personal avant-garde movies anyway.

It is no use, then, looking for a fixed genre classification and steady genre labels. People collect and group with one or more goals in mind and those goals determine the focus of the selection. Thus, potentially there can be as many genres as there are (combinations of) attributes to align them on but, in practice, this will be restricted to all the possible (combinations of) goals that people may want to search the body of works with. There may be many attributes and many goals, but this number is not infinite because there is a large but finite number of people alive so far.

1.5 Genres develop over time – change is everlasting

People are born and die, the world changes, and because of these three things, changes occur in people's goals, in cultures, in beliefs, values, norms, worldviews, interpretations of works. Technology pushes the creation of new forms (e.g., video letter, video game, first-person shooter, augmented reality, augmented virtuality, blogs, MSN, twitter). Marketing changes labels if that boosts the sales: What used to be gossip was later on called human interest and is now reality soap. Audiences change their preferences (e.g., radio play is out, podcast is in). Content creators produce more works of fiction; fire, decay, and disaster destroy the older work. And therefore it must be that the more dynamic a society is, the more genres, as part of a culture and affected by beliefs, worldviews, and the comparison to other works, are negotiated and changed (cf. Buckingham, 1993, p. 137).

1.6 The ontological function of genre labels

Being overloaded by information is not something people are keen on. Because in that case, people have to recognize and remember each single event on its own. Grouping things on the basis of certain commonalities helps to reduce the data (see Rosch in Chapter 1). It is important for information management. The heuristics that is applied then is “what applies to the group also applies to its members.” A violent video game better be bloody; a horror movie better be gruesome. If content providers do not live up to such genre conventions, they run counter to expectations and disappoint the user.

Schemas or psychological scripts are more-or-less fixed programs people run in their heads to execute repetitive tasks (e.g., Abelson, 1981; Matter Mandler, 1984). The script of going to the supermarket triggers all the action sequences you have to perform (i.e. take cart, select groceries, pay, go). Genres do the same. A romance triggers the schema of two people who fall in love, probably have a hard time, and then live happily everafter. According to Fitch, Huston, and Wright (1993), genres structure and guide our media experiences. If the romance is about people falling out of love, having a good time being alone, and ending up miserable together, viewers are at least puzzled or at worst frustrated. That is not what a romance is expected to be about.

One morning I turned on the radio (EO, *De Ochtenden*, Radio 1) and heard that the communist leader Chávez of Venezuela had ordered to invade the Antilles, a Dutch protectorate. Later on, I learned from my newspaper that Curaçao, one of the Antilles, was cross with the Dutch broadcaster because it turned out that their report had been completely fake and a highly irresponsible form of ‘what if’ journalism (Parool, 2007b). My neighbor got a letter that said “Hi darling, how are you doing? ... I was in Paris the other day and saw a car just like yours. ... When are we going to have a drink again? Lots of love, M.” That made his wife extremely suspicious about the time he presented a paper at a Software Engineering conference at the Sorbonne. The sudden appearance of ‘M’ made him have a lot of explaining to do.

In both cases, genre had pulled a trick on me, my neighbor, and many others who were not aware of its fraudulent use (cf. Box 1). In the case of the invasion of the Antilles, the radio report by an otherwise serious broadcaster (high credibility) made me immediately attribute truth to the information, without thinking twice. There were no cues in the message that were unrealistic enough to make me reappraise the epistemics. Missing out on this requirement is what set this radio report apart from humor and made it an irresponsible hoax.

What happened, again, was the application of a simple heuristics. If it is in the news, it must be true. If this is a love letter, the husband must be untrue. My neighbor and his wife were not the only victims of this fake ‘love letter’ he got from the Renault car company. My newspaper reported that many angry customers filed a complaint at the manufacturer and that quite a number of marital relationships were put under pressure (Parool, 2007a). And all this happened simply because the genre had preset our default concepts of what to believe or not, upon which truth was attributed to the information. So if one uses the forms that come with the genre too realistically, one is not funny any more but a liar (cf. Chapter 3, Rule 2).

Box 1. Fabricated news

In *Tomorrow Never Dies* (Spottiswoode, 1997), media tycoon Elliot Carver cheerfully greets his personnel with: “Good morning, my golden retrievers. What kind of havoc shall the Carver Media Group create in the world today? News?” He then sets out to provoke a war between Communist China and the UK to create a media circus that should lead to world domination (Figure 2). This may be a greatly overblown picture of the news media appropriate only in a James Bond movie but intentional manipulation and fabrication of news is not rare. Good news seems to be no news (Emsley, 2001), no news is bad news (Bromley, 2001), and bad news is good news (Cohn & Cope, 2001, p. 8).

Business man Sylvio Berlusconi was the first to establish a private commercial TV empire in Italy, the Fininvest broadcasting holding, with Canale-5, Rete-4, and Italia-1 becoming official national TV channels under the Mammi law. Berlusconi later became the Prime Minister of Italy and used his three TV networks to conduct a publicity campaign, attempting to prevent a referendum on a number of controversial issues from taking place (Padovani & Calabrese, 1996). During Gulf War II, Fox News was used by the Bush administration for public relations and propaganda purposes (Hiebert, 2003). In addition, Fox News convinced about a quarter of its viewers to vote Republican (DellaVigna & Kaplan, 2007). The Mexican media concern Televisa is the largest content creator in the Spanish-speaking world. Its founding father, Emilio Azcárraga Milmo nicknamed “El Tigre,” made no secret of his affiliation with Mexico’s Institutional Revolutionary Party and Televisa being openly in support of governmental policy. “I am a soldier of the President of the Republic,” Azcárraga declared (Preston, Apr. 18, 1997). *Noticieros Televisa*, the daily news show, digitally erased the face of Senate President Santiago Creel from a news clip about a forum on energy reforms in Mexico. Creel accused Televisa of boycotting him due to his new Law on Radio and Television, a reform that was heavily criticized by Televisa and TV Azteca. Televisa acknowledged changing the images but only as “a mistake in editing” that had nothing to do with censorship (Ramos & Jiménez, July 16, 2008).

Figure 2. Elliot Carver: “Soon I’ll have reached out to and influenced more people than anybody in the history of this planet, save God himself. And the best he ever managed was the Sermon on the Mount.”¹

¹ <http://www.imdb.com/title/tt0120347/quotes>



1.7 All cows are animals but not all animals are cows

“What applies to the group also applies to its members” is too simple a heuristics. Because the news genre is factual, this news item is factual. A love letter is written between lovers; therefore, my husband must be in love. Although genre is supposed to be categorical, in fact, it is not, due to the changing nature of its hybrid

members. We have seen that not *all* instances fulfill the genre rules; we can merely assume that *certain* instances fulfill the genre rules, but who they are and how many of them do so and to what extent is uncertain (cf. Poincaré's underdetermination thesis). Which throws us back to epistemic appraisals, looking for cues that make the story seem realistic, such as credibility of the source, consistency of the information, or plausibility.

The previous chapter explained that as a child, we learn to trust systematic, consistent, and rewarding behavior of an authority, upon which our notion of truth is founded. Genre labels are the decrees of unreliable authority. They automatically activate the attributes that by and large apply to its members and keep us from verifying that. This pushes us into overgeneralization and makes us jump to conclusions on the basis of a single example.

1.8 Represented reality and perceived realism

One reason why formal genre classifications will never be successful is that often the distinction is overlooked between attributes that are physically there in a work and the perception by the receiver. If in Figure 1 you classify the blue square, green circle, and pale blue triangle as the genre of things with cool colors and the rectangle, pink triangle, and the red heart as the things with warm colors, that may formally be correct but people probably do not notice unless you tell them. If we want to classify works on the basis of realism (fiction, non-fiction, fantasy, reality soap), the same incongruency between formal analysis and daily use will occur.

The things that are empirically there (edges, curves, colors, words) and that more-or-less resemble the physical world together form the *represented reality* or *designed realism* of a work (Konijn & Hoorn, 2004). The represented reality is a characteristic of the stimulus and can be analyzed by a computer relatively easily: You compare and count the number of things that are similar to the ones in the physical world (the realistic features) and those that do not resemble the physical world (the unrealistic features). The reality as represented in the stimulus will evoke a level of *perceived realism* in the receiver (Shapiro & Chock, 2003) – the extent to which someone thinks that reality is reflected in a work. However, the level of perceived realism may be different for each individual although the represented reality remains stable for a particular work. What we need, then, is a reality-based genre classification that matches people's perceptions. If we do not, as Chapter 5 will show, we ignore the fact that perception easily overrules 'the way it was meant' by the designer.

2. Reality-based genre classification

Genre classifications are usually based on the *representation* of reality in a work. We conducted a study with 312 film viewers to see whether such a classification was in line with viewers' *perceptions* of realism (Konijn & Hoorn, 2004). We consulted the literature on film genres (e.g., Bordwell, 1989; Bordwell, Staiger, & Thompson, 1985) and chose 11 conventional genres that were supposed to represent reality to a certain degree, with documentaries following the laws of nature and the practices of daily life and horror and fantasy following magical, mythical, or fantastic ideas. In between were genres such as psychological drama, comedy, and science fiction. We listed the genre labels and had the viewers indicate their preferences by checking "yes" or "no" behind each genre label. The idea was that if someone liked horror a lot, s/he would also like science fiction but less so psychological drama and romance. Vice versa, someone who preferred documentaries would probably opt for social realism rather than fantasy and thriller.

A hierarchical cluster analysis of the viewers' preferences for conventional genre resulted in four clusters of reality-based genre preferences, which we coined: *Reality registration*, *Reality simulation*, *Believable fantasy*, and *Unbelievable fantasy*.

The cluster of *Reality registration* refers to the recording of the physical world in such a way that the recipient regards it as reality. This genre cluster includes documentaries, journalism, historic reports and reconstructions, live television, and scientific data sampling. The traditional genre label is non-fiction. Yet, telephone calls, answering machines, video conferences, e-mails, or chat sessions also go under this heading because the communication partner is a mediated person. One never knows how far messages are manipulated and to what extent people mean what they say or fake who they are. Therefore, the representation of the voice over the phone is a fiction with highly realistic features.

Most of the contents of the reality-registration genres claim to be from direct observation but this is actually not so. There is always a medium involved and for the receiver, the information is second-hand. In *Manufacturing Dissent*, Debbie Melnyk (2007) analyses the documentaries of Michael Moore (e.g., *Fahrenheit 9/11*) to find out that he manipulated the chronology of images and facts or staged certain situations to make his political message more persuasive. In *Shooting in the Wild*, Chris Palmer (2010) confesses that wildlife filmmakers often fib and mislead their audiences. Many animal confrontations in wildlife documentaries are set up by the filmmakers to obtain the "money shot," using and sometimes victimizing caged animals that were bred at so called "game farms."

In any case, reality-registration genres do emphasize a natural performance style and can have high ‘information value’ (Shapiro & McDonald, 1992; Green, Garst, & Brock, 2004, p. 163); you can learn something from them about the world. In the previous chapter, the *picture* of the elephant man Joseph Carey Merriek – not the man himself – is an example of the reality-registration genre.



Figure 3. Animals that record their lives have no author intentions, yet produce fiction, albeit of a hyperrealistic nature. Snail with videocam (a). Award winning photographer cat (b).

Even if author intentions are absent, reality registration is still part of fiction, although it may be on the hyper realistic side. For example, the highspeed mini-camera that BBC1 mounted on a snail (Figure 3, a) in *Animal Camera* shows a mere selection of the snail’s whereabouts at a pace that is not the snail’s own. In 2007, Mr. Lee, a cat (Figure 3, b), won the “world’s biggest small photo award” for photographic talent.¹ Each minute, the camera automatically took a picture wherever the cat went. Actually, these photographs show a mediated world. They are a selection of the cat’s life and even if there was no human interference at all, you still were not the cat yourself. In other words, anything mediated has to be regarded as fiction, even in the absence of intentional acts of manipulation, although some fiction is more realistic than other.

Reality simulation contains genres that are traditionally called realism: psychological realism, social realism, drama, and romance. This type of genre does not register so much what goes on in the physical world (cf. Figure 3). It rather gives a rendition or a model of real life (Oatley, 1999). These genres form a framework with which the receiver can interpret the physical world and regard that as reality (“This is how it went,” see Box 2). Surprisingly, this lines up soap operas and psychodramas on the artistic side with computer simulations and explanatory models on the scientific side. What both soap operas and scientific models have in common is that they offer an artificial replication, a realistic imitation, or a model of the external world rather than a registration (cf. A. I. Miller, 2000, p. 252). Things that happen in the external world are replicated in a design, in maths, or acted out in a lifelike manner (Konijn & Hoorn, 2004). Yet, the speculation (the ‘what if’) and the make-believe (the ‘as if’) are stronger than in documentaries and other reality-registration genres. Impersonated characters play after life and

1. Retrieved Aug. 26, 2009 from <http://www.kat-cam.com/cat-cam%20photomagazin.pdf> and http://www.kat-cam.com/squeaky_fotomagazin.html

Box 2. Playing yourself

One could counter that if someone plays him or herself, the reference is not to another person, and thus, a form of reality registration. For instance, *United 93* (Greengrass, 2006) focuses on flight 93 at 9/11, on which passengers and hostesses managed to avoid the hijackers to attack Washington. The film director asked the flight leaders and other officials to play themselves.

Yet, the person as an actor may come close to the same person as a flight leader, but they are not identical (also see Chapter 3, Section 4.2). Their tasks are different (acting vs. flying) and there is a time lag, in which the person evolved: Before the incident, the world view of the flight leader was probably different than thereafter. As close as *United 93* may come to Reality registration, the person as an actor plays him or herself as an official, a historic person, and thus, s/he does Reality simulation.

the actions are performed, staged, or computer generated. Thus, John Merrick the movie character (see Chapter 1) already moves from ‘possible’ into the direction of ‘false.’

The danger with reality registration and reality simulation genres is that we tend to take them for real. In 2001, the American Psychoanalytic Association awarded the television series *The Sopranos* (1999, HBO) for their accurate and most believable rendition of a psychotherapist. In sessions around the country, the therapy of Tony Soprano, a mafia gangster boss, was proposed by patients as an example of how they wanted treatment (Gabbard, 2002). People easily misattribute truth to scientific models, realistic movies, and video-conference calls – and in certain cases this is warranted (e.g., psychiatry in *The Sopranos*) whereas in others it is not (e.g., psychiatry in *Ordinary People*, 1980). The only thing we got is asking ourselves how do we know how *they* know? Where did they get that information from? The misattribution of truth is important because we think we can put more trust in a person we consider “real” and “true” than in a fantasy figure, although the latter is not necessarily lying and may have quite some ‘information value.’

Believable fantasy is the flip side of the scale. From here, the connection with existing or historical figures is cut off (again, according to our beliefs or world view). Not the complete character and its setting refer to something existent in the physical world but only bits and pieces do. One of the traditional labels is ‘adventure.’ Action movies, thrillers, and comedy fall within this cluster (Konijn & Hoorn, 2004). Pseudo-science is in this area provided that science is what we believe in. Idolatry and superstition are also on the fantasy side of the scale provided that we hold our own belief system for a ‘true’ religion.

The contents of believable fantasy focus on extraordinary events in daily life (e.g., a zoomorphic deity comes to speak to us), the characters are more detached

(it is not about their inner psyche), and the actions are invented or fabled (again, according to our beliefs). This type of genre is fantasy that still provides clues to make the character or a situation believable. The action hero still resembles a human that can be in pain. The elephant deity Ganesh (previous chapter) still has recognizable hands, ears, and trunk; after all, plastic surgeons were able to stitch an ear on the back of a mouse as well. In *Last Action Hero* (Tiernan, 1993), Jack Slater (played by Arnold Schwarzenegger) steps out of his movie into the ‘real’ world. Now he feels pain when he hits someone and has to reload his gun, which, in his movies, he never had to do. *Last Action Hero* typically plays with the genre labels. Although *Last Action Hero* pretends that Slater steps out of the fiction (his movie) into reality (or better, into the physical world), the actual transition is between a more unrealistic scene (believable fantasy) and a more realistic scene (reality simulation). However, that answer to Slater’s question “Where am I?” would probably spoil the fun.

Unbelievable fantasy is a cluster consisting of what is traditionally called ‘fantasy,’ for example, horror, Sci-Fi, and cartoons (Konijn & Hoorn, 2004; also Basalla, 1988/1999, p. 71, p. 76). These productions focus on extraordinary events but not in daily life (e.g., realm of the gods, realm of the dead, parallel galaxies, animals smashing each other over the head). The actions become absurd, the characters are often caricatures, and the worlds that are described are impossible (of course, dependent of our beliefs). In Figure 6d, we see a less realistic representation of Ganesh. The connection with real hands, ears, and trunk is broken and everything is depicted using green leaves. Although someone with a Hindu background may believe that Ganesh exists as depicted in Figure 6c, they probably will deem the green-leaf version an artistic interpretation of the elephant god.

The range of *Reality registration*, *Reality simulation*, *Believable fantasy*, and *Unbelievable fantasy* is also applicable to computer-generated environments. Figure 4 is downloaded from Wikipedia and shows an overview of environments that are enriched or fully created by computer images.²



Figure 4. Mixed-reality taxonomy (Milgram & Kishino, 1994).

The reality-based genre classification fully fits the mixed-reality taxonomy of Milgram and Kishino (1994). In the area of Reality registration, there is the Tangible User Interface, which consists of physical objects that people can interact with. The objects correspond to a computer model that updates itself each time the

2. Retrieved Apr. 24, 2008 from http://en.wikipedia.org/wiki/Projection_augmented_model

user manipulates the objects. This type of interface is high on realism because the user acts with things in the physical world. It is a form of registration because the computer monitors what the user does handling physical objects and does not pretend to 'add' things to the physical world.

Reality simulation covers so called Augmented Reality applications. Starting from an existing environment, it projects computer images onto the physical objects as if these textures and objects were part of the physical world. Particularly the 'as if' part makes it a simulation. People can interact with the mock-up of a machine as if they were really handling it. The monarch butterfly (Figure 4) is projected in space as if it really flies into an office. The more the projection becomes unrealistic (a blue-colored monarch), the more Augmented Reality moves towards Augmented Virtuality.

Believable fantasy includes environments that are artificially generated but still allow images of things in the external world to be integrated into the computer-generated world (Augmented Virtuality). One could imagine a multiplayer game-environment in which the players have the faces of some existing friends, recorded by a Web cam, while people are playing with them online. The environment is completely computer-generated but bits and pieces relate to things that exist in the physical world (e.g., the player's friends).

Unbelievable fantasy encompasses truly immersive Virtual Reality, which can exclude input from the external world most rigorously (except from the technological equipment itself). This makes it the most 'fantastic' technology – you can get closest to a dream. However, even if the projections are not fantastic but photo-realistic, you still see that you are surrounded by technology and so it can never be as realistic as a Tangible User Interface. Tangible User Interfaces and Augmented Reality have more of the physical world in them and perhaps add a projection to it (more realistic), whereas Augmented Virtuality and Virtual Reality are almost to completely artificial (more unrealistic).

Note that the borders between the genre clusters are not clear cut and that they are viewpoint dependent. This is because 'truth' is a continuum of probabilities and because the epistemic appraisals are based on the different ratios in the perception of realistic and unrealistic features of the mediated figure or situation. Within a genre cluster, therefore, there may be different ratios of realistic and unrealistic features of its members. Some are perceived as more realistic than other, also within a genre cluster. Owing to the number of features perceived as realistic, someone could easily classify a virtual tutor as reality simulation although the connection to a real person may be absent (Box 3). When Jack Slater and his opponent enter 'reality' (which of course is just the wrong labeling of another type of fiction scene) more realistic rules apply to the story: Slater's opponent, the villain Benedict (Charles Dance), discovers that in the 'real' world, he can shoot

Box 3. Quasimodo

Quasimodo, *The Hunchback of Notre Dame*, (Hugo, 1831) is not a historical figure but a fictional character invented by Victor Hugo. His movie image is shown in Figure 5 in a rendition by Charles Loughton (Dieterle, 1939). Quasimodo's fictional status is similar to John Merrick, the performed elephant man (Chapter 1), but not to Joseph Carey Merrick, the historical figure the elephant man was modeled after.



Figure 5. Quasimodo. Believable fantasy, lightly taken as reality simulation.

someone without being caught within the next thirty seconds. From a Hindu perspective, Ganesh would not even be in the fiction department of Figure 6 and within a secular view, the statement “It is written in the Book” would mean something similar to “fake,” “far out,” and “I don’t believe it.”

3. Applying genre to the fiction-reality framework

Fiction makers put a lot of effort in make believe. To literally make you believe that what you experience refers to things that truly exist and happen in the physical world, they label their mediated, and thus fiction products as reality soap, docudrama, virtual reality, and most amusingly, non-fiction. Their idea is that if you think their work is highly realistic, you will like it better and be more involved with the characters. They would like it to be just as realistic as talking to your friend on the phone. Even fantasy stories or game characters make sure that large parts of their design are realistic (i.e. the flow of the game AI). Spiderman still looks like a man. In the depiction of Ganesh (Figure 6, c), we can still recognize a human, an elephant, a mouse, and a lotus flower.

Knowing what genre a message belongs to sets the parameters for attributing truth (Figure 6). It is a concept-driven operation to make the choice easier for you that the information belongs to fiction (e.g., Hollywood movie) or refers to what you regard as reality (e.g., a scientific journal paper). If I had introduced to you Joseph Carey Merrick (Figure 6, a) as a fantasy figure in a 19th century play (much like Quasimodo) and John Merrick (Figure 6, b) as a scientific picture from the archives of the Royal London Hospital, you probably would have believed that Joseph did not exist and John did. Genre sets the stage for the attribution of truth to a mediated person or situation.



* Note: According to a Christian belief system.

Figure 6. Reality-based genre classification inserted into the fiction-reality framework (a, b, c, d).



If you have no genre labels to go on such as novel, journal, or software package, you can only rely on data-driven processes that are evoked by genre characteristics (cf. Hoorn, 2000/2011). You can see that John (Figure 6, b) is more artistically depicted than Joseph (Figure 6, a). When you zap through the TV channels, all kinds of clues help you determine this is a popular scientific documentary about the Galapagos and not a feature movie about Darwin. Genre knowledge provides a context to interpret the message with. Genres help to shape your assumptions whether the person you see or talk to has reference to an existing person or not – although, theoretically, you do not know.

Figure 6 shows how genres fit in the categorization of judgments on fiction and reality. The statements between double quotes are the result of epistemic appraisals. Through these appraisals, a degree of perceived realism is established. What you think is true in everyday life is, according to your beliefs, based on solid evidence, on what you have seen with your own eyes or perhaps what you have

learned in Bible class. On the unrealistic side within reality, as an eyewitness, you may describe a situation like 9/11 as unbelievable and “Just like the movies.” If you had met Joseph Carey Merrick in the physical world, you would have thought the same. The ‘genres’ we encounter in everyday life are, for instance, being in class, in a work meeting, or having a conversation with friends. But once we open a book, answer the phone, go to a concert, when people without a religious background attend a sermon in church, or when someone starts to lie, we enter the world of fiction. In Figure 6, on the far left side of what could still be possible (although it is fiction) is the documentary type of products. Because they are high on realism, it is easy to mix up these products of fiction with the realism of situations you consider to be part of reality. Reeves and Nass (1996, p. 8) state that “The automatic response is to accept what seems to be real as in fact real.” Hence, the misattribution of truth.

These insights make it easier to analyze the problematic and take a position when authors are accused of not telling the truth in their work. For example, Riverhead Books retracted Margret B. Jones’ *Love and Consequences* (2008) about her life in the ghetto because she never lived there. Being praised in *The New York Times* at first, everybody was shocked when her sister spilled the beans that Jones was not her real name and that she was not a half-white, half-Native American foster child working as a drugs runner in South Central LA.

First of all, society was more outraged than was warranted. After all, because Jones, or actually Seltzer, put her story in a book, all readers should have been aware that this is fiction. As explained, fiction is all information that is from indirect observation (hearsay, media) in contrast to the information from direct observation, which we call reality (a not necessarily correct mental representation of the physical world). Blaming Seltzer that she did not describe reality was mixing up two levels of analysis. The discussion should not have been about fiction or reality because by definition, a book is a product of fiction.³ Instead, the discussion should have been about genre. Seltzer’s lie was in the framing. She presented her work of fiction as a documentary (reality registration) whereas she actually wrote a novel (reality simulation or believable fantasy). That may not be such a severe lie. Moreover, she did not provide (strong) enough cues (e.g., unrealistic details) so that the audience would detect the fiction all by herself (see Chapter 4). In a way, then, Seltzer was a good realistic-fiction writer. At least, Michiko Kakutani (2008), the literary critic, found the story quite convincing before he found out there was a mix up of genres, although he did not analyze it that way.

3. Which also holds for this book.

4. Genre in the theory of fiction

Through education, upbringing, and cultural socialization we learned which communications relate to believable things and which to the unbelievable. Genre labeling is an instantiation of the concept-driven mechanism of ontological classification but it is more fine-grained than the fiction-reality distinction. Genre labels indicate sub categories of reality or fiction that induce different grades of perceived realism. Examples of genre in what we regard as reality are a meeting, a speech, or following class. As soon as a face-to-face encounter is mediated (e.g., e-learning, a Skype call), it belongs to the realm of fiction. The term non-fiction for televised documentaries, fact-based novels, or broadcasted news items, therefore, is nonsensical. It should be reserved for face-to-face types of genre that have no play, media, modification, or theatrical elements in it – and that will hardly ever be the case.

Almost all works are complex hybrids of simpler forms, which are called genre attributes (another word for features). These features may be lines, edges, words, or technologies. Complex hybrids are combinations that cling together in many different ways. They form different alliances dependent on the genre attribute – the selection criterion – in focus. There are as many classifications possible as there are attributes to focus on. Which attribute someone selects depends on the goals of the search, which are changeable. Because people are born and die and because the world evolves, beliefs, cultures, and people's goals change; hence, genres change.

If in a way the genre issue is so complex, then why do people bother to create genres at all? A number of reasons why people want to make classifications of the works they encounter is for data reduction, to have simple interpretation rules (heuristics), to guide their experiences (what should I feel, what can I expect), and for the attribution of truth. The heart of the matter is that people find it convenient to think that what applies to the group applies to its members. Viewers may want to select a romance because they are in the mood for love. Actually, it is even more superficial than that, in that the attributes that the genre label evokes (e.g., science is true) are instantly applied to a given work. If it was not for this concept-driven inferencing (or the more superficial transfer of associations), people were forced to continuously do data-driven monitoring of the features of a work to detect attributes that might indicate one or the other genre, or another genre, or yet another (cf. Hoorn, 2000/2011). Yet, due to the liability to change of its hybrid members, genre is not categorical. Assuming that it is, bears the risk of overgeneralization and the misattribution of truth.

Genres are groups of works that share attributes or features. The more a work belongs to a genre, the more attributes it has in the shared set, and thus, the less unique that work becomes. A truly unique work would be a genre of its own. It would have nothing but distinctive attributes, which is not possible because that would deny that people follow education, share a language, or have a common understanding – it would be a work that does not communicate. The prototypical work is the least unique because it shares most attributes with other works in the genre and has the fewest distinctive attributes. Perhaps the only unique attribute it has within a genre is that it is the prototype. Prototypes continuously change, however, so that prototypical works do not stay unique on that aspect for long. Because the periphery changes all of the time, figuring out who is the prototype is an ongoing process.

To look for fixed genres and genre labels, then, is a hopeless endeavor. Most genre classifications are based on work-immanent characteristics. Scholars want a data-driven means to see how works connect (cf. Hoorn, 2000/2011). However, even if theoretically one could come up with a clear cut division that is based on text, picture, or motion analysis, and that is dynamic enough to keep up with change, it would not have much predictive power for human (search) behavior. The reason is that there may be a big difference between what is designed in a work and how it is perceived.

The reality that is represented in a work and the extent to which people perceive its realism are two different things. *Represented reality* is the degree to which all the features that are concretely there in the artifact resemble features of whatever thing or event in the physical world it is depicting. *Perceived realism*, however, is the result of a subjective appraisal of the number of features of a work perceived as realistic in contrast to the number of features perceived as unrealistic. Perceived realism is the outcome value of the process of epistemic appraisal and is, of course, susceptible to perceptual biases and encoding flaws (cf. Dror, 2005). Certain features are ignored, some inserted from personal fantasy, some are more salient or familiar than others, and some beliefs make certain features more important. This has consequences for the number of features and the weight they have during the perception process. Moreover, how the contrast between (the weighted) realistic and (the weighted) unrealistic features is calculated in a person's head (subtraction, division, relative cardinality, a regression function?) may be different for each individual and remains an unsettled matter. Yet, any genre classification that wants to have some ecological validity needs to relate representation to perception.

This chapter reported on an attempt to connect representation to perception in reality-based genres. The results of this study indicated four genre-clusters that

can be integrated with the fiction-reality framework. Because that particular reality-based genre study focused on mediated genre exclusively, its results apply to the fiction side of the framework alone. If we assume that on the truth continuum, fiction moves between what is probable and false coinciding with the degree of realism that goes from more realistic to more unrealistic, the order of genre clusters in fiction is from left to right: Reality registration (e.g., documentary), Reality simulation (e.g., psychological drama), Believable fantasy (e.g., action movies), and Unbelievable fantasy (e.g., Manga games). This grid is valid for films and books but can also be applied to various VR technologies (Tangible User Interfaces, Augmented Reality, Augmented Virtuality, and Virtual Reality, respectively).

Registration and simulation of what one thinks reality is about can be understood from the following analogy. Reality simulation creates a *model* of that part of the physical world that is regarded as reality. This model can be artistic or it can be scientific (cf. A. I. Miller, 2000, pp. 252–256). Reality registration is comparable to *sampling* or *recording data* in the physical world that someone regards as reality. It could count as a verification of the model: The documentary as a control on the soap story. However, in both cases, model and measurement remain fiction because there are still unrealistic features present and the best it can get truth-wise is to be plausible. Therefore, the danger occurs that people take registration and simulation for real. They misattribute truth to the highly-realistic fiction genres, make these works part of their reality conception, and then think whatever reality genres depict is actually existent in the physical world.

Reality registration is more plausible and realistic than Reality simulation but both have unrealistic features as well. With Believable and Unbelievable fantasy genres, this ratio collapses. The unrealistic features dominate the realistic features; even more so in Unbelievable fantasy, which is also more ‘false.’

CHAPTER 3

Derailing the concepts

From metamorphosis to impersonation to metaphor

“Some actors seek parts similar to their personalities. But I prefer undergoing a metamorphosis that depends on the role.” (Willem Dafoe¹)

Sometimes things happen that disrupt our world view. That we should be capable of adapting our understanding of the world is well-illustrated by biological metamorphosis or shape-shifting, which happens when an organism goes through a sharp change of physical structure (cf. butterflies, frogs, salamanders). If you cannot let go of fixed concepts, caterpillar and butterfly appear to be two unrelated animals. Metamorphosis occurs frequently and does not only happen to animals but to humans and dead matter as well. For many organisms, shifting into another form has great advantages, for example, to avoid danger or attract sexual attention. Because metamorphosis occurs so often and urges to reconsider the boundaries of ontological classes and the attribution of truth, this chapter discusses the position of metamorphosis in the theory of fiction. It offers a set of rules to distinguish different types of metamorphosis and demonstrates the relation between metamorphosis and impersonation, personification, and metaphor. Finally, this chapter offers a theory of how metaphor takes metamorphosis from shifting forms into shifting meanings as well.

1. When the belief system hampers

Classification of the physical world into categories such as genres (Chapter 2) is convenient for the application of truth to continuously incoming data. However, sometimes data enter that cannot be readily classified because there is no class available or because there is a poor fit – not every feature can be retrieved to the same category. As Lakoff (2008, p. 23) puts it: “It is a common cognitive phenomenon that a fact that fits an overall conceptual organization is remembered better

1. Retrieved May 9, 2009 from
<http://www.quotesea.com/Quote.aspx?q=someactorsseekpartssimilartotheir2>

than a fact in isolation or one that contradicts an overall conceptual organization. Ideas make sense when they fit a whole system of ideas.”

A fascinating phenomenon that tends to derail fixed categorizations is natural metamorphosis, the transition of an organism or a physical entity from one state into another. An example of metamorphosis of dead matter can be found in the evolution of our own sun. It is hard to imagine that in 5 billion years our sun will look very different from what we are used to. At that time, it will have consumed its core and will collapse, while fusion takes place in the shell around the core. The pressure caused by the fusion in the outer layers will expand the shell tremendously and the relatively low temperature will color it red. In an even later stage, this red giant will collapse again and what remains is the core of the old star, a white dwarf, which will have a high density, consisting of degraded atoms (plasma). The white dwarf will send out its remaining heat until a black carbon ball remains – a dead star.

Without a background in astronomy, no one would admit that a white dwarf or a red giant is just another form of being a sun. The transition from sun into red giant and then into a white dwarf challenges the ordinary belief system, its concepts and classifications. For the observer of a metamorphosis, a mismatch is likely to happen between data (red giant) and concepts (sun), which makes people wonder whether this is real or merely storytelling.

2. Natural metamorphosis opens the door to taking fiction for real

In this chapter, I want to discuss a number of fiction devices that have a weaker or stronger disruptive effect on the belief system, that make one re-think the ontological classifications, and that open ways to deal creatively with the data. They are impersonation, mistaken identities, identity theft, and metaphor. I believe that these fiction devices make use of comparable principles, the tenet of which is natural metamorphosis. I have no evidence to show for. It is an idea and in this chapter I want to try how productive that idea might be.

My conception is that in the beginning, people saw natural metamorphosis of butterflies and frogs as transformations between different categories of beings as if today cats really would transition to dogs. Analogous to natural metamorphosis, people came up with imaginary variants like a woman becoming a fish or a man becoming a horse. For the early audiences, changes in outer appearance were acceptable in stories or on stage because, indeed, they knew about natural metamorphosis or derivations thereof (cf. Figure 1). By creatively combining women with fish or men with horses, all kinds of qualities between, in this case, humans and animals were exchanged (sleek woman, fast man), which is also what

metaphors do. In role playing, moreover, it is simple to say that “You are the fish” and “You are the horse” after which simple metaphors can occur such as “The woman is a fish” or “The man is a horse.” In becoming well-established artistic devices of their own, the connection between metaphor, impersonation, and natural metamorphosis was lost later on. Metaphor and impersonation became part of the culture as independent phenomena.

Figure 1. Hawk-moth caterpillar (a) and crocoworm (b). CrocoWorm photoshopped by Favardin.



If the hawk-moth caterpillar (Figure 1, a) is capable of performing a snake then why would not the crocodile caterpillar be capable of performing an alligator? Next I will set out a technical usage of the notion of metamorphosis as a way of defining the concept. I want to explore the thought that people had implicit rules about metamorphosis that became productive in various forms of fiction devices. It should be possible to formulate such rules and see whether they describe impersonation, mistaken identity, metaphor, etc. If this is so, we perhaps tracked down a mechanism that creates fiction in a way that is similarly disruptive as a first encounter with natural metamorphosis.

Additionally, I will distinguish true from false metamorphosis and argue how that distinction relates to creation and fiction. I will demonstrate the distinction by exploring the parallels between natural metamorphosis and impersonation. Natural metamorphosis involves changing into another state irreversibly, whereas impersonation involves changing oneself indistinguishable from someone else, such that a recipient might think this is irreversible – a false metamorphosis and hence, fictional. In the next sections, I formulate a number of rules that gradually evolve into the definition of different types of metamorphosis, which may explain why one or the other form has a (smaller or larger) disruptive effect on someone’s fixed concepts, world view, or belief system.

3. Rules of metamorphosis

If we look at the development of the butterfly from egg, caterpillar, pupa, to adult, then natural metamorphosis is a process of transformation, which inputs a current state of an entity and outputs a future state. Examples of transformations are to delete, add, or reorganize features, adapt features, or to change their importance and functionality. There will always be a comparison involved between current

and future state, whether prospective, while processing, or in hindsight, else the stages will not be perceived as related, be that as the same entity in different forms or as one entity transitioned to another. With this in mind, the following rule may be formulated.

Rule 1. General rule of natural metamorphosis

According to a given belief system, an entity in the current state needs transformations to become an entity in a future state that refers to a category of entities that, again according to that particular belief system, exists in the physical world

The introduction of the belief system is necessary because for someone without knowledge of the biology of butterflies, frogs, etc., larva and adult may be perceived as unrelated (see the Aristotle example later on). Let us see if the general rule of metamorphosis holds for species other than butterflies and frogs. For example, it takes the jellyfish five transformations to become a medusa (the mature adult), including being a polyp or even the segment of a polyp (Figure 2). Applied to the general rule of metamorphosis, we get:

1a. According to modern Western biology, polyp (*scyphistoma*) in the current state needs transformations to become a segment (*ephyra*) in a future state that refers to a category of entities (“jellyfish”) that, according to belief, exists in the physical world



Figure 2. Becoming medusa.

During its life cycle, an eel goes through six stages, including a transformation from willow-leaf larva (*leptocephalus*) into a see-through thread of glass (Figure 3). According to the general rule of metamorphosis:

1b. According to modern Western biology, a willow-leaf larva in the current state needs transformations to become a glass eel in a future state that refers to a category of entities (“eel”) that, according to belief, exists in the physical world



Figure 3. Eel metamorphosis (photo by Uwe Kils) (a, b).

However, in the view of Aristotle (384–322 B.C.E.), eels did not evolve as depicted in Figure 3. He thought that mud was the basis from which worms were created, which in their turn were transformed into eels. Let us see, then, whether the introduction of the belief system makes a difference.

*1b. According to modern Western biology, mud in the current state needs transformations to become a worm in a future state that refers to a category of entities (“eel”) that, according to modern Western beliefs, exists in the physical world

Indeed, the belief system is necessary because according to modern biology, worms do not change categories or belong to the category of eel (or other fish). The belief system needs to be changed into ancient Greek natural history to make *1b true.

3.1 Three test criteria

The general rule of metamorphosis (1) may hold for several examples and the dependence on the belief system may be correct. Yet, Rule 1 does not tell why the Aristotelian view on eel, although creative, is misconceived as a proper description of natural life. In what follows, I develop a number of criteria to test Rule 1.

I. *Common categories from the first one up*

Although natural metamorphosis molds an entity into another form, the two forms still remain plants, animals, or stars. In other words, within a given belief system, the entity refers to the same category throughout stages. Without the requirement of common category membership, a baby frog could be regarded a fish and the adult an amphibian. Thus, the change is within the physical or biological category, not between categories. In Aristotle’s world view, worms and eel perhaps may be of one and the same category but mud probably is not. So here, Criterion I is violated in that Aristotle suggests a transformation from a physical into a biological category.

Figure 4. From lizard into bird.



There is a hitch, however. The previous paragraph described the viewpoint of a strong believer in his own belief system and who preserves strict category boundaries (Chapter 1). There are creationists, for instance, who accept that species can evolve within the category (e.g., a white moth becomes a black one) but not beyond the category (e.g., lizard becoming bird). Evolution scientists do not hesitate to accept that *Archeopteryx* (Figure 4) is the link between lizards and birds and natural history shows more examples of cross-breeding (e.g., lichen). The demand of common categories, then, is limited to the degree that a belief system determines which category boundaries can be transgressed. For the creationist, no boundaries can be transgressed; for the evolutionist, certain categories are permeable (e.g., from lizard to bird), whereas others are not (e.g., from mud to eel).

II. *Sufficient (dis)similarity*

As stated in the beginning of Section 3, metamorphosis induces a comparison between states. The entity in the current state must have features that potentially lie in the intersection with the features of the entity in the future state. Else, there is no connection between states. If disconnected, the organism dies (try to create an eel out of a worm); if disconnected, lead could be turned into gold (cf. Criterion I). Put differently, one should be capable of perceiving similarity between two states as a function of the size of the intersecting features (cf. Hoorn, in prep.). If similarity is too high, we cannot speak of metamorphosis. Tomorrow, the caterpillar has become older but this one distinctive feature is not enough to speak of a different form of today's entity. Thus, a considerable amount of dissimilarity between two states is necessary as well, which is a function of the size of the set of distinctive features (cf. Hoorn, in prep.). Aristotle capitalized too much on the similarity between worms and eels (e.g., both long, brown, and living in the mud), ignoring the distinctive features (e.g., having a spine or not), which may be due to a lack of biological knowledge in his times.

III. *Irreversibility*

A white dwarf cannot become a red giant again and a silver eel does not turn back into a glass eel. Thus, instances of a physical category may change structurally, while preserving a level of similarity; they can never be changed back. Metamorphosis in the natural world cannot be reversed. A dead man does not become alive again. The old woman will never be a baby again. The transformation is definite. Checking the criteria I–III indicates whether a metamorphosis as defined by Rule 1 produces fiction or not, something I will discuss next.

4. True and false metamorphosis

The sun that turns into a red giant or the baby that becomes an old woman are examples of true metamorphosis because they follow Rule 1 and are scored 'true' on the criteria of:

- I. within-category (physical or biological) from the first one up
- II. partial but sufficient (dis)similarity, and
- III. irreversible transformation

True metamorphoses relate to physical changes in the natural world, whereas false metamorphoses relate to imaginative changes on a conceptual level. If the metamorphosis complies with Rule 1 but fails on one or two of the criteria I-III, it is still a metamorphosis but a 'false' one. Consider the example of the hawk-moth caterpillar (Introduction):

1c. According to modern Western biology, a hawk-moth caterpillar in the current state needs transformations (e.g., pumping up its tail) to become a caterpillar in a future state that refers to a category of entities ("snakes") that, according to modern Western biology, exists in the physical world

Although 1c is correct according to Rule 1 and meets Criterion II, it fails on I and III. The metamorphosis produces a fiction. The hawk-moth caterpillar transforms its tail to resemble a snake (II: partial dissimilarity is true) but the process is reversible (III: false). Moreover, the caterpillar and the (reference to a) snake do not share all the higher-order biological categories: Although they are animals, a caterpillar is not a reptile (I: false). In addition to Rule 1, then, there are two general rules for false metamorphosis, which depend on being a lie or not.

Rule 2. In the case of a lie:

It is *stated* that Rule 1 applies, although at least one of the Criteria I-III is not met

During Gulf War II, Iraqi dictator Saddam Hussein used lookalikes to decoy the American Army. Under Rule 2, the metamorphosis would be:

2a. According to a Western political belief system, a Saddam lookalike in the current state needs transformations (e.g., grow mustache, get plastic surgery, wear a uniform) to become a Saddam lookalike in a future state that refers to a category of entities ("dictators") that, according to that Western political belief system, exists in the physical world

However, Criterion II is violated because the lookalike seeks to minimize dissimilarity without giving a clue that distinctive features may be present and III is violated because the dressing up can be undone. Criterion I is met because the transformation takes place within the same biological category (i.e. humans).

Rule 3. In the case of art:

It is *proposed to imagine* that Rule 1 applies, although at least one of the Criteria I–III is not met

3a. According to a Western political belief system, a TV actor in the current state needs transformations (e.g., puts on make-up and mimics Obama) to become an actor in a future state that is imagined to refer to a category of entities (“presidents”) that, according to that Western political belief system, exists in the physical world

Again, Criterion II is violated because the actor seeks to minimize dissimilarity. However, s/he does give clues to the distinctive features (e.g., a genre indication such as stand-up comedy or TV film). Criterion III is violated because the dressing up can be undone. Criterion I is not violated because the transition is within the same biological category (i.e. humans). The only difference, then, between the Saddam imposter and the Obama impersonator is the claim to truth of the imposter and his attempt to hide any clue to dissimilarity in the case of a lie (Rule 2).

3b. According to a Western belief system, a stage actress in the current state needs transformations (e.g., puts on a furry suit and walks like a bear) to become an actress in a future state that is imagined to refer to a category of entities (“animals”) that, according to the belief system, exists in the physical world

Here, Criterion II is probably not violated because the impersonation of a bear will not be perfect. This happens because Criterion I is violated in the attempt to make the transition between different biological categories (human $\neq$ animal). Criterion III is violated because the actress can take off the bear suit. The performance is not a lie because there are many cues to its fictionality: genre indications (stage acting), unrealistic elements (e.g., the walking).

Examples 3a and 3b show metamorphoses that output an impersonation for two different styles of acting. The actor who plays Obama such that he completely identifies with the character and experiences the character’s emotions as his own is an example of so called Stanislavskian or Method Acting (Konijn, 2000, p. 37), a style often employed in Hollywood productions. Elvis impersonator Matt Lewis, for instance, stated: “For a while I did let the fact that I play Elvis define me, but now that it no longer does, I’m my own person, and I’m better able to approach the character and make it more believable” (Lawson, 2008). The actress playing

a bear is less likely to feel the same and be like the bear. She probably employs a more detached style of acting (cf. Meyerhold or Brecht), where it is allowed that the actor's presence is visible (Konijn, 2000, p. 39). The difference between the two styles of acting is that the metamorphosis is more complete in Method Acting but also more limited in its domains (cf. Criterion I). It is easier to transform into another human being than to enact the deepest thoughts and feelings of a turnip (cf. the *Blackadder* TV series: Curtis, Atkinson, & Elton, 1983–1989, BBC).

Human creativity operates as false metamorphosis at first. Particularly in the stage of imagination and before implementation, making new conceptual blends equips one entity with the features of entities from associatively unrelated categories (Hoorn, in prep.). If the creator stops the false metamorphosis halfway, the combination of a woman with a fish becomes a mermaid, which is fictional.

4.1 Impersonation

Impersonation is the attempt to imitate through a number of alterations something or someone else. I would not want to restrict impersonation to acting or portraying the character of another person; it could also be an animal, a speaking tree, or it could be a crowd of supernumeraries playing flowers in the background. Impersonation is pretending to be someone or something else by rendering a representation of that other person, being, or thing. This form is very productive for stage acting and other forms of role playing. I will use the term in a general sense in that someone copies the characteristics of another person in, for example, gesture, style, and speech or copies another thing in, for example, structure, color, and motion. When this is done with fraudulent intentions (cf. Rule 2), it is called imposture; when done with honest intentions (cf. Rule 3), it is an acting performance.

4.1.1 *Impersonation in the natural world*

Impersonation is not restricted to intentional human behavior. It can be recognized in plants and animals as well. Particularly in plants, there is no willful act involved but the ability to impersonate is inherited – it has become part of the genetic inheritance. There are animals that try to be a plant, plants that try to be an animal, and animals that try to be their opposite sex or that imitate other species. One could say that non-human impersonation is creative because out-of-category entities are presented as being similar (Hoorn, in prep.). It is a kind of creativity, however, that evolves slowly and is repeated time and again. After the first time it showed up in natural history, its originality dropped (but not its effectiveness) with every next generation.

Figure 5 shows the Indian leaf butterfly (*Kallima inachus*, a) that looks like two dead tree leaves glued together. The butterfly went through so many evolutionary cycles just to hide from possible predators. The European fly orchid (*Ophrys insectifera*, b) evolved leaves that look like a female insect to attract male flies and bees for pollination.



Figure 5. Indian leaf butterfly (a) and the European fly orchid (b).

In Figure 5, the Indian leaf butterfly tries to be a plant and the European fly orchid tries to be an animal. The leaf butterfly and the fly orchid took centuries of time to look like other species. In the case of certain sea creatures, however, changes occur within a life span under the regulation of hormones.

When anemone fish are born (*Amphiprion ocellaris*), they are all males (Figure 6, a). Their mother is the only female in the group and she is the absolute monarch. As soon as she dies, the dominant male takes her position and transitions to female. For sheephead fish (*Semicossyphus pulcher*), it is the other way around (Figure 6, b): When the dominant male dies, the largest female transitions into male through a hormonal change and takes over leadership. Scientists call this gender change “*Protogynous hermaphroditism*.”



Figure 6. Anemone (a) and sheephead fish (b).

An example that goes into the direction of intentional behavior comes from the male cuttlefish. Like a drag queen, he can change his appearance and mimic a female. According to marine biologist Roger Hanlon, small male cuttlefish show sexual mimicry to outsmart the larger male competitors (Hanlon et al., 2005). Disguised as females, the small males seem harmless. They can get close to the eggs of the females to fertilize them without having to get into a fight with bigger jealous males (Figure 7, a).



Figure 7. Australian small male cuttlefish impersonating female exemplar (a). Mimic octopus can impersonate more than 15 different species (b).

The Mimic octopus (*Thaumoctopus mimicus*) (Figure 7, b) lives in the seas of South East Asia and is capable of imitating 15 different species. When attacked by damselfish, it can imitate the form and motions of a sea snake, a damselfish predator. By a change of colors and body shape, Mimic octopus impersonates lionfish, flatfish, brittle stars, giant crabs, sea shells, stingrays, flounders, jellyfish, sea anemones, and mantis shrimp (Norman & Hochberg, 2005).²

In the Introduction to this book, we met a fake snake performed by the hawk-moth caterpillar, which was meant to ward off enemies. We saw the flatworm that transformed the tentacles of the amber snail into caterpillars to attract bird victims. The Indian leaf butterfly looks like dead tree leaves to fool its predators; Mimic octopus imitates a repertoire of sea creatures to the same purpose; the fly orchid developed its looks to attract sexual attention. The Australian cuttlefish acts like a female to decoy sexual competitors. The anemone fish and the sheep-head fish adjust gender so to effectuate changed power positions. In other words, there are clear evolutionary benefits in true metamorphosis (i.e. anemone and sheephead fish) as well as in faking one, impersonating another being (i.e. hawk-moth caterpillar, flatworm, leaf butterfly, fly orchid, cuttlefish, mimic octopus). By looking like someone else, you can chase away your enemies, lure victims into your trap, stay unnoticed when you hunt or are hunted upon, you can draw (sexual) attention, gain sexual advantage, gain power, or stay clear of danger. Would humans go through elaborate transformations for similar reasons?

4.1.2 Human impersonation

In the army, the police force, or while hunting, there are clear cases of impersonation used for pure survival. Behind enemy lines, Special Forces may wear the uniform of the adversary to stay unnoticed; army equipment is covered with camouflage nets to create the illusion of shrub. Figure 8 shows the outfit of a deer hunter wearing Intrusion™ Treeline Fabric. In pretending to be a tree, copying the structures, branches, and leaves on the material, the hunter makes himself invisible for his prey in the way the Indian leaf butterfly hides for its hunters.

Figure 8. Intrusion™ Treeline Fabric (a), a camouflaged deer hunter (b), and the Indian leaf butterfly (c).



The examples of impersonation in Figure 8 may be of pure survival but in human culture we see many derivations thereof, particularly in relation to courtship, for

2. <http://www.youtube.com/watch?v=H8oQBYw6xxc>

the improvement of social positions, self-aggrandizement, or in drawing attention, sometimes of a sexual nature.

In Paris, fashion model Naomi Campbell presented an orchid-shaped hat designed by Philippe Treacy (Figure 9). What she actually wore was an imitation of the sexual organs of a plant, which guide the joining of the sperm with the ovules. Now if we follow Owyong's (2009) line of thought that women's clothing raises female sex appeal and aims to seduce men, then the reason for wearing the hat comes close to that of the orchid imitating an insect. The human tries to look like an orchid and the orchid tries to look like a fly for much the same reasons of drawing attention and improving sexual attraction.



Figure 9. Orchid woman (a), fly orchid (b).

During the First World War, Ross Hamilton (1889–1965) was a soldier in the Canadian Army. He was not so much appreciated for being a warrior but rather as an entertainer, performing the pretty girl character 'Marjorie' (Figure 11), who remained popular throughout the Second World War.

This is an example of impersonation being entertaining by, in this case, representing the opposite sex with comic intentions. Adjacent to entertainment purposes, Långström and Zucker (2005) showed clinical evidence that at least heterosexual men crossdress for sexual arousal. Thus, next to the sheer survivalist strategies, entertainment and (sexual) arousal may count as extra motivations to impersonate. However, making fun or sexual excitement perhaps were not Ross' only motivations. For Ross, as well as for the small male cuttlefish, looking like a girl helped to dodge the fighting.

More speculatively, in *Some Like It Hot* (Wilder, 1959), the musicians Joe and Jerry escaped from Chicago gangsters by dressing up as Josephine and Geraldine. This gave them access to a girls' band where they were allowed to see and do things, otherwise forbidden to men. Similar to the cuttlefish, Wilder seemed to suggest that dressing like a girl made it easier to access girls.



Figure 10. Australian cuttlefish (a) and entertainer Ross Hamilton (b).

Crossdressing is one thing but impersonation can be so extreme that it manifests in corporeal form and becomes part of someone's very person or body. Transsexuality may be associated with physiological responses that are atypical to the

biological sex. These sex-atypical responses take place in specific hypothalamic circuits, possibly as a result of neuronal differentiation (Berglund et al., 2008). Transgender people (Figure 11) tangle with a complex of gender identity, emotional distress, sexual desire, and social nonconformity (Lev, 2005). They sometimes take hormones to start a medical sex-reassignment process (ibid.).

Figure 11. A Web community for transgender people, cross dressers, lady boys, etc.



Private Calpernia Addams, for instance, underwent an extreme make-over. After the first Gulf War in which he served in the Navy, Addams decided to transition to female.³ In the reality soap *Transamerican Love Story* (Figure 12), Calpernia as a transgender woman has romantic encounters with male bachelors.⁴

Figure 12. Calpernia Addams.



The hormonal change in the body to transform from man into woman or vice versa resembles the transition of the male anemone fish to female or the female sheephead fish to male (Figure 6), albeit for different but, nevertheless, existential reasons. The fish changes sex for reasons of social hierarchy, transgender people out of intrinsic motivation – a strong feeling that they were born the wrong sex (Berglund et al., 2008).

We saw that impersonation by humans may have survival purposes (e.g., camouflage), may be done for entertainment reasons, sexual attraction, sexual arousal, or inner need (e.g., transgender transformations). There is also impersonation that is curiosity-driven, to “feel what it is like to be that person.” This kind of impersonation is accompanied by empathy, wishful identification, and emotional involvement (also see Chapter 5).

Elvis impersonators (Figure 13), of course, want to have fun but that is not all there is to it. The admiration for the rock hero translates into the wish to be like ‘The King’ and through that, be identified with some of his desirable features: sex appeal, talent, success, riches. The earlier quoted Elvis impersonator Matt Lewis even said that “For a while I did let the fact that I play Elvis define me” (Lawson,

3. Retrieved Dec. 16, 2008 from <http://www.calpernia.com/>

4. Retrieved Aug. 25, 2011 from http://en.wikipedia.org/wiki/Transamerican_Love_Story

2008). Elvis impersonation equipment can be bought on the Internet. The result is an upgrade in good looks (see Figure 13).



Figure 13. Elvis impersonations (a, b).

Certain people even go further and model their bodies after their idols. The International Society of Aesthetic Plastic Surgery (ISAPS, 2008) conducted an informal survey of 20,000 plastic surgeons in 84 countries to explore which celebrity body parts were the most requested. ISAPS reported that Angelina Jolie and Brad Pitt “came up more often and for more body areas of choice than virtually any other individuals” (ISAPS, 2008).

The wish to be like someone else also can be found with present-day knights in a jousting tournament who celebrate that Leeds exists for 800 years (Figure 14). Twenty-first century men play medieval knights to the tiniest historic detail. On the one hand, there is the genuine interest in medieval history, how it was, how it felt, but also the thrill of being associated with fierce and courageous men who do not shy away from close quarters combat; yet, without putting their lives at stake.



Figure 14. Jousting tournament in Leeds.

Impersonation also can be used to safely experiment with social conventions. On-line role playing games (RPGs), for instance, are multiplayer (computer) games in which the user plays one of the game characters, its ‘avatar.’ Second Life is an online role playing game in which users can experiment with social behaviors. In Second Life (Figure 15), for example, the avatar can be adjusted in outer appearance and no one can retrieve the identity of the user. Thus, behaviors that otherwise would be problematic socially are possible. Shy people may overcome emotional boundaries but it could also be that an old man plays a young prostitute.

Figure 15. Avatars in Second Life.



Impersonation can also be used to trick and fool people by switching identities. Identical twins, for example, sometimes fool their teachers by sitting into each others exams to avoid that one of them fails (e.g., Jain, Prabhakar, & Pankanti,

2002). In Figure 16b, we see actor Roy Rifkin with his stunt double. We might think that Roy does his own stunts but actually the character is played by two impersonators, one for tough action and one for subtle emotion. The advantage for Roy is that he stays clear of danger while the unknown double improves his status by imitating the celebrity. In Figure 16c, we see the Chinese inventor Zou Ren Ti sitting next to his robot copy but it is hard to tell them apart. The robot can do all kinds of household jobs for Zou Ren Ti. Yet, if the inventor could upgrade the action possibilities such that they matched the quality of the robot's exterior, the inventor could actually use his lookalike as a true agent that represents him at various tasks outdoor: A neat way to broaden your action range and be at two places at the same time.

Figure 16. The identical Nelson Twins (a). Roy Rifkin and his stunt double or his twin brother? (b) Zou Ren Ti and his twin brother or his robotic lookalike? (c).



In sum, there is a whole plethora of reasons why plants, animals, and people imitate, copy, or mimic the behaviors and actions of another being or thing. Impersonation has many benefits. By looking like someone else, you can chase away your enemies, lure victims into your trap, stay unnoticed when you hunt or are hunted upon, you can draw (sexual) attention, gain sexual advantage, gain power, or stay clear of danger.

In part, impersonation is used for pure survival (e.g., hiding for predators) but also for fun (e.g., Ross Hamilton), for exploration of social conventions (e.g., Second Life), for intentional lying (e.g., the twin example), for sexual attraction (e.g., the orchid hat), or to be supplemented with desirable qualities (cf. the Elvis example). It may also lead to a certain allure (e.g., being courageous) without facing true consequences (cf. the jousting knights). Impersonation may come from a strong inner need like we have seen with the transgender girls. Pretending to be someone you are not may give access to certain privileges, for example, to meet women in their boudoir (cf. the Australian cuttlefish) or it may increase personal status (e.g., Rifkin's stunt man). And sometimes, mixes of all those reasons make people impersonate and assume the character of someone else.

4.1.3 *Metamorphosis as the mechanism of impersonation*

The previous sections showed that impersonation is not just a folly or restricted to stand-up comedy. It is widespread; something found in many different organisms, not limited to intelligent behavior (cf. the fly orchid or the flatworm example) and

quite beneficial. Thus, stage acting is just one although very sophisticated form of what could be called a survival strategy.

Impersonation, then, is the outcome of morphing the appearances and behaviors of another entity onto the self in such a way that others will perceive the fiction as realistic and in cases of confusion even as ‘reality.’ To get to the desired state of looking like something or someone else, the transformation may unfold in small steps. In its simplest form, an actress puts on a hat and pretends to be a flower. Likewise, identical twins such as The Nelson Twins (Figure 16, a) probably do not have to change much to mimic their counterpart. In extreme cases, however, such as a body makeover or a sex-reassignment treatment, plastic surgery and hormones interfere profoundly with the physiology and create a new form that can even affect one’s feeling of identity.

In all these instances, the belief system is at stake, in some cases more than in others. In the illustration of the fashion model with the flower hat, the situation is clear and only mildly threatens the fixed concepts and categorizations of the observer. Under Rule 3b (Section 3), Naomi Campbell merely proposes to imagine that she refers to a category of entities (“flowers”) that, according to the belief system, exists in the physical world. The identical twins do not have to go through many adaptations (perhaps put on similar clothes, change the accent a little) but under Rule 2, they do shake the belief system. Criterion II (Section 3) is violated by the twins fooling the teacher because the lookalike minimizes dissimilarity without hinting at the distinctive features (e.g., different fingerprints: Jain, Prabhakar, & Pankanti, 2002). It is not only the lie that will shock people but also their failure to distinguish the one person from the other, that is, not seeing through the fiction.

The belief system is truly at stake if people have to accept that a man becomes a girl. After hormone treatment, could we speak of an artificial form of “*Protogynous hermaphrodism*” in transgender people comparable to the anemone and sheephead fish? Or is it still a person who pretends to be the opposite sex, comparable to a transvestite? Put differently, are we talking about a true or a false metamorphosis?

For the voters of the Italian beauty contest in Salsomaggiore Terme, the answer was clear. After a known society journalist blogged that one of the contestants actually was a transgender male who ‘infiltrated’ the beauty contest, all fingers pointed at Alessia Mancini, a tall girl with broad shoulders.⁵ She left the contest crying because she was eliminated by the text messaging Italians who needed no further proof (Genovesi, 2010).

5. <http://www.alessiamancini.it/>

Impersonation is disruptive, particularly when fiction cannot be told from reality. Crossdressers and drag queens experiment with the fiction-reality confusion. The fascination for men playing females and females playing men is rooted in the tension between sexual arousal and repulsion,⁶ which coincides with the fiction-reality confusion. When straightforward ontological classification causes fiction to be taken for reality, the transgender person is believed to have the preferred sex and thus exerts arousal. Yet, when a contra-indicative cue is observed and epistemic appraisal seems to indicate the actual gender, repulsion occurs (cf. the Mancini example). In the case of Ross Hamilton, this attraction-repulsion-play may switch back and forth, the more the performance is perceived as realistic and viewers alternate between fiction and reality. If you want to experience the confusion of discovering that someone is a transsexual, watch *The Crying Game* by Neil Jordan (1992) and follow the love story between Fergus and Dil.

4.2 What is an identity?

We saw that certain species such as anemone fish and sheephead fish can change sex. We also saw transgender people who transformed their bodies through plastic surgery and hormone treatment. An impersonator such as Matt Lewis lost himself in his role. Method Actors often claim that they have completely become the character they play (Konijn, 2000, p. 37). Molotov Alva (Box 1) illustrates that certain people can be so absorbed in virtual worlds, that they forget who they are.

Box 1. Forgetting about yourself

In the fake documentary *Molotov Alva and His Search for the Creator: A Second Life Odyssey* (Gayeton, 2007), the protagonist loses complete control over his identity. He disappears from his real life and gradually forgets his physical embodiment to become his avatar in Second Life. This virtual documentary is completely shot on Second Life and shows that Molotov Alva undergoes such an identity crisis that he visits his own virtual museum of memories to find his old self back again (Figure 17) (Retrieved Aug. 29, 2009 from <http://www.molotovalva.com/>).

Figure 17. Molotov Alva searches himself in his personal virtual museum.



6. <http://www.culturamix.com/cultura/curiosidades/carnaval-porque-os-homens-se-vestem-de-mulher>

Nature can transform an entity from one stage into another. When a larva changes into a dragon fly, the organism is almost completely rebuilt, molecules change position, become part of different organs. Kelly (2010, p. 128) goes so far that he deems every organism a process of evolutionary change rather than an entity. Given the assumption that we are just another animal species, then what is identity at a particular moment in time? How much identity can we actually attach to the biological stages we go through – morula, blastula, embryo, baby, child, adolescent, adult, elderly? Nobody recognizes the 90 year old in the embryo, not even the person self. If we had never seen our own baby pictures, picking the right one from a range of pictures of race-and-sex-similar babies would never exceed chance level.

The notion of identity is commonly approached from a psychological and a social perspective. Psychologically, identity is an unchangeable element in someone's physicality, psychology, and social characteristics (Côté & Levine, 2002, p. 8). It would be a sense of being a unique individual that *remains consistent* throughout various life stages or other transformations – “self-sameness over time” (ibid., p. 17). It is an element of continuity that for the self as for others distinguishes the individual from other individuals as discrete, separate, and indivisible.

Socially, group identity is based on common features as compared to distinctive features of other groups. Politically, such features may be special rules and behaviors (e.g., free market vs. planned economy) or the pride a group takes in certain habits (e.g., national traditions). Social identity tells us who we are: culturally (e.g., Huntington, 2004), politically (e.g., Shayo, 2009), religiously (e.g., Peek, 2005), ethnically (e.g., Casey & Dustmann, 2010), business-wise (Keller & Richey, 2006), or gender-like (e.g., Sohn & Bosinski, 2007).

Yet, concepts about identity and the self are vulnerable to a belief system, world view, ideas, and attitudes of self and *others*. Jenkins argued that our classification of self is multidimensional (cf. religious, ethnic, national, etc.) but hardly internally consistent (Jenkins, 2008, p. 6). Collective identification may counter individual identification and may lead to expressions such as “I hate all As; you are an A; but you are my friend” (ibid.). Côté and Levine raised the question whether identity should be seen as a “unified self” or rather as a multiple, organized set of cognitive schemata, dependent of the individual, others, and the situation (Côté & Levine, 2002, p. 22). Olson (1997) as a philosopher challenged the socio-psychological view on personal identity. He took a most drastic point of view, stating that for us to persist through time is not a matter of psychology but rather biology: One could suffer the destruction of all cognitive and affective characteristics and still survive without people assuming it is not ‘you’ anymore. What is identity, he asked, if a stroke makes you become “irreversibly non-cognitive” and only the vegetative system remains? (Olson, 1997, p. 7).

Identity may be a feeble concept, then. Our brain, for example, can be influenced in the perception of our own bodies. People can be fooled into thinking that their body shape is different from its actual size. Ehrsson et al. (2005) posed that our body shapes and sizes are fundamental for self perception (cf. anorexia and bulimia). In an experiment, these researchers exposed participants to the ‘waist shrinking illusion,’ while recording brain activity with functional Magnetic Resonance Imaging (fMRI). The illusion of an expanding or shrinking waist was evoked by attaching an electronic device to the wrists. In causing vibrations of the skin over the tendon of a joint extensor muscle, they induced a lively kinesthetic impression that the joints were passively flexing, whereas in reality, they were not (the Pinocchio illusion). In putting the hands at the waist, participants thought their bodies were bigger or thinner than they actually were, while rating the experience as highly realistic (cf. Chapter 4).

Thus, identity is much dependent on perception, on what we say that remains consistent and persists throughout various life stages, even if we go through true, natural, and irreversible transformations. Identity can be easily reinterpreted, then, and restated by ourselves under the influence of what others see in us, situational demands, or religious, cultural, and national forces. Because personal identity is a matter of interpretation, it is easy to continuously revise our personal history without feeling the hindrance of being inconsistent (Zander & Zander, 2002, p. 12), keeping up the essentialist idea that we are a unique person, which cannot be broken down into single pieces. Hence, the possibility of mistaken identities (Section 4.3). The amputation of a limb or severe cognitive retardation may feel like losing part of yourself but finally, you and others will assume that a core remains, which is ‘you.’ Some will call that ‘the soul,’ Buddhist thinkers would call this ‘Being’ (e.g., Tolle, 2005). Personal identity, then, is a matter of socio-psychological attribution but is – like Olson argued – neither sufficient nor necessary for an organism to persist.

4.2.1 *What could the core of being be?*

Many people would agree that the core of a human being is the soul, something that persists even in the afterlife. Others would state that “being” equals mindfulness or silent vigilance, all that is immaterial, unspeakable and unemotional (Tolle, 2005). In a sense, this position denies the idea of identity because “being” is having access to a greater force in the universe of which the physical world is a mere manifestation. That resembles Kelly’s (2005, p. 123) position that our process of being is the inevitable outcome of how the universe unfolds with minor variations at the surface level, an almost Classicist perspective.

At the biological level, one could elaborate on Olson’s view that it would be the DNA structure that remains constant through the various life stages.

Nevertheless, it is unclear what more than 95% of our DNA actually codes for. Most of our DNA does not seem to have a function. Exceptions are the telomeres, at the end of the chromosomes, which become shorter with each cell division and supposedly are responsible for aging. The rest of the DNA consists of genes, the information carriers. However, this information may be mutated under the influence of sunlight, chemicals, or radio-activity. Moreover, genes change during maturation, and alteration takes place during aging (Tawa & Sakurai, 1993). Methyl molecule groups may link up with parts of the DNA, a process called DNA methylation, affecting which genes come to expression at a certain moment. Without any mutations in the DNA itself, methylation can change the functions of our genes such that slight changes can have major consequences.

If DNA is lost, reorganized, and re-functioned, what is it then that remains consistent between morula and old man? If it is a more-or-less coherent but not identical set of genes that go through more-or-less similar but not identical transformations and that are responsible for more-or-less the same but not identical functions, the only thing that binds it together and makes it a 'person' is our self-image, a fiction.

According to Tolle (2005, pp. 93–94), when two people interact, they are actually dealing with four *fictional* identities: Both have a mental conceptualization of the self as well as of the other, and according to Tolle, none of the four self-constructions designates a 'being.'

Perhaps we should see it like this. In a soup of atoms, the 'universe,' certain molecules bind together, form a pattern or structure, which temporarily has some coherence, we might call it a system (cf. Kelly, 2010, pp. 57–58, pp. 113–114), but in the case of an organism molecules are constantly exchanged by other molecules coming in and out from the soup (e.g., eating, losing hair, cutting finger nails, amputation of a limb). Due to random variation, these patterns or structures slightly differ from each other, which makes us see them as individuals. If slightly different individuals are – as a group – largely different from other individuals who seem to be similar as a group, we consider them 'other species.' Over time, the coherence between molecules per individual degrades, collapses, the exchange of molecules with the outside world stops, and then we say it 'died.' Thus, perhaps the difference between an organism and dead matter is that for dead matter there is no continuous exchange of molecules between the system and its surroundings to maintain the system as is. For dead matter, there is only the moment of conception (a tiny bang) and then slow decay. Identity, then, would be partial in so far a molecule structure that is called an organism can be distinguished by an observer from other molecule structures (which may not be organisms) and is whole and unique if no resemblance is perceived with any other molecule structure in the universe. Because the exchange of molecules is time dependent, the amount of

personal identity attributed to it changes over time. Identity is the temporary typicality of a molecule pattern in exchange with the outside world.

4.3 Mistaken identity

If an impersonation does not give a clue to the differences between the two stages in the transformation process (Criterion II), mistaken identities are likely to happen. The entity in the end state of the transformation (the fictional character) is easily confused with the person that the character refers to. This is due to the instability of a person's identity (previous section), a concept that cannot rely on physical steadiness. After all, identity changes naturally over time and can be changed artificially by, for example, surgery and hormone treatment, or by Pinocchio illusions.

The effect of the stunt double (Figure 16, middle) or the Saddam imposter is based on mistaken identities: The fiction of the end state of transformation is taken for the real person it refers to. The slight differences between the character and the person it impersonates can be attributed to particular circumstances (e.g., lighting, tension, different clothes) or can be interpreted as the next stage in someone's life transitions ("He has become old," "She looks younger than ever").

4.4 Identity theft

Earlier in the book, we saw that the application of truth is strongly connected to ethical considerations. Some of the examples discussed so far were relatively innocent (someone playing Elvis or a knight). The metamorphosis puts up a fiction but does not harm anyone. Mistaken identity as effectuated by a stunt double in a movie is not too harmful either because it is controlled by Rule 3 (cf. Box 2). The deer hunter in camouflage is already a doubtful case – at least to the deer. The Saddam imposter, however, or the twin who pretends to be his brother to avoid the brother's failure on an exam deliberately speculates on mistaken identity under Rule 2.

Box 2. Alan Smithee

Movie directors who are unsatisfied with the final cut of their film and do not want their name on the title role do not lie when they use the pseudonym 'Alan Smithee.' Like this, the convention of the name replaces the statement that "I am angry." As an angry young man, Alan became a very productive director this way (e.g., American History X, Kaye, 1998).

A really severe case of mistaken identity that is deliberately meant to harm people is identity theft or acquiring false identities. In 2008, for example, the online detective bureau Ultrascan reported that Hotmail boxes were hijacked by

Nigerian and Italian scam gangsters, using so called key loggers, virus software that copies passwords. The imposters sent messages to the contacts in the mailbox, writing: “Dear friend, my money was stolen from the hotel where I stayed. Could you transfer the amount to the hotel manager through Western Union?”

Criminals attempt to access sensitive information by stealing driver licenses, passports, social security cards, airplane tickets, credit cards, or a season pass (cf. Figure 18). They write e-mails to the owner, impersonating an institution or organization to try and retrieve private information; this is called ‘phishing.’ Most shocking news is that they are not necessarily strangers who make illegal use of someone else’s means of identification. In many cases, the phisher is someone you know, a colleague, neighbor, friend, a relative, or a family member (Cate, 2006).



Figure 18. Fake ID templates.

The phisher is like the flatworm invading the amber-snail brain to steal the snail’s identity (see Introduction). The flatworm is a phisher using a fake ID (‘I am a caterpillar’). In all the examples thus far, humans show survival strategies similar to those used by (lower) animals and plants. They use metamorphosis as a fiction technique to gain profit or to avoid danger. In the case of role playing games or theater, this is merely experimentation with the moral and social parameters that pertain to such behavior. In the case of phishing, these parameters are violated so that a basic survival strategy is translated into anti-social behavior.

Section 4.2.1 posited that what ties our changing genetic being together as one continuous entity is our self-image. However, neither genes nor self-image are on our ID card. So what is the phisher actually stealing? The phisher steals a photo and some text that refer to a collection of mutated molecules called genes that have come to expression at a certain moment in time and that have raised a self-image that is valid for the momentary stage in the metamorphosis that the entity is continuously in. The phisher uses that fiction to refer to someone s/he is not so to gain concrete advantage. That fiction is a legal agreement between people that a particular image designates that particular molecule structure, with to a certain extent incoherent DNA, that calls itself an entity.

For some lawyers that is not actually stealing. On September 6, 2007, two players of the Internet game *RuneScape*⁷ threatened a third gamer, a classmate, to transfer a valuable mask and an amulet to their computer. The lawyers of the suspects argued that stealing virtual objects is similar to stealing air – because the

7. <http://www.runescape.com/>

object is fictional, you basically steal nothing. The judge decided differently, stating that virtual objects are bought and sold for real money, on the Internet or in the schoolyard (Parool, 2008). Note, then, that the value of money is fictitious in itself because it is merely a *representation* of a certain amount of labor.

Yet, virtual objects and experiences of virtuality do not only have real-life consequences such as extortion or being bullied. If a phisher can steal an identity, which is fictional, someone can also steal another person's digital persona. After all, 'identity' is a self image that continuously changes and may be better represented by an adaptive avatar such as Molotov Alva than by a static picture on a plastic card. Moreover, ideas can be stolen; otherwise, why bother about the protection of intellectual property?

As argued in Chapter 1, there is always a physical side to fiction objects. An idea has to be materialized in order to be communicated and then it can be stolen. A stage character has an actor behind it, a person's identity has a more-or-less coherent genetic code behind it – something we call a person. An avatar in a virtual world has a more-or-less coherent code behind it, software, and without that software code, the object would not be visible or 'stealable.' In other words, stealing a virtual object is comparable to stealing a photo or an art object.

5. Metaphor

It may well be that transformations observed in the natural world (e.g., the butterfly) inspired humans to use metamorphosis as a creative device in storytelling, theater play, and imagery. Due to limited knowledge, it moreover may have appeared that species transformed over biological categories: A little fish becoming a frog, out of a worm grew an eel. In analogy, it may not have been hard for an artist to write down that fair Medusa's hair grew into snakes.⁸ In the same vein, creationists may argue that Archeopterix is nothing but an evolutionist's metaphor to illustrate trans-category change.

Now if worms potentially are eels, fish potentially are frogs, and a hair potentially is a snake by the will of the gods, overgeneralization of the transformation observation may have led to the assumption that anything can be potentially transformed into everything that looks like it (Rule 3, Criterion II). In this way, ill-conceived metamorphosis would underlie animism and disguised divinities: "Homeric gods [...] generally assume the mask of a mortal character. The identity of the divinity hidden under the *persona* is known to the poet and revealed to

8. Athena punished Medusa with snake hair because Medusa (the victim!) was raped by Poseidon (see Ovid's *Metamorphoses*, 8 C.E., Book 4, 770).

the audience” (Clay, 1974, p. 9). Transformation, then, is one way of opening up possibilities for creating comparisons (similes) such as ‘she looked like a tree, her arms were like branches, and her fingers resembled twigs.’ Ill-conceived, cross-category metamorphosis may lie at the heart of creativity, instigating the idea to combine entities across distinct domains (Hoorn, in prep.).

Yet, things may look alike but is the assumption of a potential transformation really necessary to explain metaphor? Not necessarily. The fact that we are capable of comparing things may suffice. If someone sees a curvilinear form, it may remind him or her of an elbow as well as a tree branch. Parallel activation of ‘arm’ and ‘branch’ may lead to the comparison that ‘an arm is like a branch’ on the basis of sharing one single feature: the curvilinear form (cf. Chapter 1, Rosch’s co-occurring features retrieved to different categories). ‘An arm is like a tree branch’ is easily abbreviated to ‘the arm is a branch.’ However, this is a proposition that could be mistaken for a literal statement about the human condition that human arms actually *are* branches, making humans similar to divinities that change shape all the time. At least in a modern Western belief system that would derail the fixed concepts and classifications and this is where (false) metamorphosis comes in.

In the case of metaphor reception, the knowledge of metamorphosis created the epistemic condition for suspending disbelief (cf. Rule 3). Knowing about natural metamorphosis created the willingness to imagine that any two things could belong together on the basis of a shared feature and created the willingness not to immediately reject that proposition as absurd. Knowing that natural metamorphosis exists makes us accept and contemplate (for a while) impersonation and metaphor. The observed similarity between entities suggests the connection that is strengthened and increased by a mental reconstruction of the transition of forms. A false metamorphosis takes place in the head to make two remote entities belong to each other based on similarity (Hoorn, in prep.).

At what lengths can we go in explaining metaphor from ill-conceived natural metamorphosis? Let us see if Rule 3, metamorphosis as applied to art, can be applied to comparisons that are almost completely conceptual, such as metaphor, and see whether transitions from one state to the other are required to understand the metaphor and not reject it as utter nonsense.

In *Living with Lava*, Lisa Westberg Peters (2003) compared lava with toothpaste: “It squeezes out of a volcano like fiery black toothpaste.” There seems to be some consistency between lava and toothpaste, for instance, that they are both viscous and run from an opening. However, certain discrepancies between the concepts exist as well: Toothpaste usually is not black and burning. It seems that toothpaste needs to be made fit to compare to lava. Rule 3, then, states that:

3c. Imagine that toothpaste in its current state needs transformations (e.g., make it fiery, color it black) to become toothpaste in a future state that refers to a category of entities (“liquid stone”) that, according to Western geology, exists in the physical world

In the poem *Metaphor*, Eve Merriam (2004) writes that the “Morning is a new sheet of paper for you to write on.” In this example, the adaptation of the morning is not made explicit but the reader will stretch the morning onto a flat surface to imagine someone writing on it. Rule 3, then, says:

3d. Imagine that the morning in its current state needs transformations (e.g., stretch out to a flat, white surface) to become a morning in a future state that refers to a category of entities (“writing materials”) that, according to Western beliefs about communication, exist in the physical world

What should be transformed, the topic of the comparison (e.g., Noun1: morning) or the frame of reference for our imagination (e.g., Noun2: toothpaste) does not seem to matter. The transformation can go from Noun2-to-Noun1 (3c) or from Noun1-to-Noun2 (3d).

It seems, then, that acquaintance with but not really understanding true metamorphosis helps us accept a false metamorphosis: Creativity is best served by broad but non-specialist knowledge (Hoorn, in prep.). In imagination, a concept can be transformed into another concept of a seemingly remote category, which in the physical world is impossible, as long as there is some basis of comparison and adaptations or transformations of features can be made to increase the similarity. The more features are perceived as the same, the stronger the impression of similarity between the stages. If features do not intersect, the metamorphosis outputs an anomaly – something that is almost unrelated to a previous stage.

Figure 19. Magikarp (a) becomes Gyarados (b).



In the physical world, unrelated stages may be impossible; in fantasy, anomalies are likely to happen. Figure 19, for instance, shows metamorphosis that outputs an anomaly. The Pokémon called Magikarp (a) becomes Gyarados (b) in its first evolution, but few features overlap.

5.1 Metaphor, what is the extra meaning?

Metaphors can be used to open up meanings that would otherwise go unnoticed. In their simplest form, metaphors state that A is B, ‘Morning is a paper sheet’ (Noun1 is Noun2), under the condition that the nouns are out-of-category. Literal statements are in-category: ‘Morning is a time of day.’ Anomalies are out-of-category but also nonsensical: ‘Morning is a yore.’ How exactly metaphor evokes such new meanings and what makes metaphors qualitatively different from literal statements (or anomalies) is an ongoing debate. I give you my rendition, based on the well-established literature and my personal empirical work. If you want an overview of the current mainstream theories, read Gibbs (2008), Steen et al. (2010), and Steen (in press). You will find that my interpretation is a hybrid of many insights, including my own, not swearing allegiance to one or the other school.

Metaphors can be used to describe first-time observations in terms familiar to the observer. By linking up with known concepts, the new entity can be better understood. In October 1993, E. Westcott of the Alaska University saw lightning flashes above the clouds that were never observed before and described them as giant ‘roots’ or ‘jellyfishes.’ Westcott reported that the flashes were brightest at the top, about sixty kilometers above the ground – where the head of the jellyfish was sited – with its tentacles hanging down (Figure 20).



Figure 20. Lightning flash is a jellyfish (a, b).

The first time encounter of a new phenomenon often stimulates metaphor production. The ‘lightning flash is a jellyfish’ is a nice example of utilizing metaphor as a way to understand something new and explain it to others in familiar terms. It is also a matter of convenience. The image of the jellyfish shortcuts an endless description of the curves, ellipses, and angles that the observer saw. Metaphors make sense of the world when known concepts are contradicted (this is not a normal lightning flash), when epistemic appraisal does not make things any more realistic (weird bulb with quirky forms hanging from it), and yet you do not want to contest your observations. Here is more metaphor from the area of chemistry:

The three-dimensional map (...) shows very clearly how the stability of atomic nuclei varies as the numbers of protons and neutrons increase. There is a “mountainous peninsula” of stability running diagonally across the map. In the lower part of the map, stable nuclei have roughly equal numbers of protons and neutrons. Further up, they have more neutrons. The mountain peaks are the so-called

magic numbers – numbers of protons and neutrons producing the extra stable closed shells. Surrounding the peninsula is a sea of instability. At the far end, at atomic number 114 is the “island of stability” (...). (Loveland & Seaborg, 1991)⁹

Although their audience is scientific, Loveland and Seaborg described their new findings in familiar terms to provide a first understanding of what was found. With my students, I sometimes play the game of counting the number of metaphors in this one paragraph from a chemistry article and some get to about 10 or 12, with “sea of instability” and “island of stability” being two novel ones and “closed shells” being an example of conventional metaphor. Metaphor is not restricted to text alone. The sea of instability drawn on the “3D map” is also represented as a pictorial metaphor (Figure 21) (for plenty of other examples, see Forceville, 1996).

Figure 21. Pictorial allegory in chemistry (Loveland & Seaborg, 1991) (a, b).



The spiked chart of Figure 21a does not seem to contain a metaphor because the length of the bars would merely indicate the size of the numbers. Yet, Fauconnier and Turner (2008) point out that also these kind of representations hold (conventional) metaphors – in this case that “more is up.”

5.2 Different kinds of metaphor

Conventional or idiomatic metaphors are figures of speech people are familiar with, such as ‘hood of a car,’ ‘bury the hatchet’ or in science, ‘quarks are building blocks’ (Huang, 1992, p. 25; also A. I. Miller, 2000, Chapter 7). They are understood as normal, descriptive, literal statements and are actually harder to process when the original metaphoric meaning is activated (Ortony et al., 1978). Conceptual metaphors are not so much linguistic conventions but rather cultural conventions. They are so deeply rooted in our way of thinking that we do not recognize that we describe time in terms of space (Fauconnier & Turner, 2008), that going up always means more (Figure 21, a), and that warmth is the same as intimacy (Lakoff, 2008).

Although interesting in their own right, conventional and conceptual metaphors are not the kind of metaphor I want to discuss here. From an epistemic point of view, conventional metaphors are no different from literal statements and conceptual metaphors are part of the belief system with which we perceive the

9. See also http://www.jinr.ru/section.asp?sd_id=103

physical world. They are fixed concepts, which are operational in fiction as well as in reality (Chapter 1).

Novel metaphors, however, derail our fixed concepts or when fixed concepts are derailed, a figurative interpretation can make sense of what was obscure at first. “Lava is toothpaste” makes us look differently at lava (it makes the molten stone softer) as well as toothpaste (never thought toothpaste could be fiery red and black). If you do not believe that burning bushes can speak and in your view, the biblical story does not seem too realistic, a metaphoric interpretation saves the priest from being a liar.

Analogies are another way to construct metaphors: A volcano is to lava what a tube is to toothpaste ($A : B :: C : D$), a container that is. Certain authors claim that metaphors are solved or understood purely by analogy (e.g., Gentner & Bowdle, 2008) but I think this is too broad an assumption, there may be other ways as well, for which I will cite some evidence later. Another metaphor type is Homeric comparison, in which something is compared to something else, which is compared to yet something else, etc. For example, her eye is a marble, the marble a sun, the sun is a bowl, that bowl is a mirror, distorting my image of her.

Finally, metaphors may not work out as intended. When they are completely incomprehensible and no figurative interpretation can be established, it is not a metaphor but an anomaly. For people in an associative mindset, that does not happen too quickly because they can always make so many transformations and through that, construct so many contexts that they can attach some meaning to a phrase like ‘the strawberry is a beep.’ A nonsensical statement such as an anomaly may be considered ‘false,’ but it is not the same as a literal statement that is false. For instance, literal statements such as ‘the whale is a fish’ or ‘Pluto is a planet’ are not incomprehensible, may not be seen as a metaphor either but rather as a false class-inclusion assertion without extra meaning intended or attributed. Such propositions counter the fixed ontological classifications but no attempt is made for reinterpretation or transformation of features to save the proposition from being false. A false literal is different from nonsense, which is also false but moreover incomprehensible due to a shortage of perceived similarity between the concepts.

5.3 Words trigger more words

Words make you think of other words. That is about all we know. If you give people a minute to write up as many words as they can when confronted with ‘moon’ and ‘child,’ the stream of words dries up around 10 or 12 items and then there is still time left (Hoorn, 1997b, pp. 149–154). Because we do not know exactly

how it works, many theories assume different mental representations. The most straightforward and least sophisticated approach is to assume that each word triggers a list of other words. In the literature, they may be called associations, or properties, attributes, aspects, correlates, or features. I keep to the convention of 'features' because it is consistent with the terminology I have used so far.

In certain theories, the word list is envisioned as a feature set, which adheres to set theoretical mechanisms (e.g., Tversky, 1977; Ortony, 1979) and which is my favorite approach although I know other accounts can do things set theory cannot. Features can be weighted because certain features are more frequently mentioned in response to a word than others (e.g., Hoorn, 1997b, p. 23). High-frequency features are supposed to be 'closer' semantically, whatever that may mean. The list can be longer or shorter, the feature set can be larger or smaller, and what the set contains can be different as a function of the particular individual, his or her development in time, and the context in which the word functions.

Other theories think in terms of semantic networks (Kintsch, 2008), which regard features as the vectors of a word and work from spreading activation assumptions, calculating link strengths as cosine values between words. Yet others say that metaphor comprehension is not about words that are triggered by other words but about fixed concepts that constitute our understanding and our culture (e.g., Lakoff, 2008).

However, nobody knows exactly how words work in mind and brain and nobody has direct evidence to show for. For my account of metaphor processing, it is enough to know that words (or in the case of pictorial metaphor, images) evoke a number of features, which to a degree are related, that features can be anything from a simple attribute, another word, a relation between two concepts, to a complete worldview. Whether features are organized as mathematical sets or semantic networks, and whether the connection between word and feature is best expressed by a correlation, cosines, or frequency number is not too important. Instead, the qualitatively different things that features refer to, is.

5.4 Different references of features

A literal feature plainly describes an aspect of the entity that the word refers to. Literal features refer to aspects of something as is – of course, within a given belief system. For instance, a feature of a man is his nose. That feature is taken literally in the eye of the observer if nothing else is meant by the description of 'nose' than nose. Literal is tautological, albeit it sometimes with different words, and then it is synonymous (cf. 'self-sameness').

A figurative feature refers to something else than the plain description of things as they supposedly are. The nose of the man may evoke the association of 'nosy' and then the nose is more like a symbol for an aspect of human character (i.e. curiosity) than the denotation of a human organ. Figurative features can be anchored in cultural conventions. A rose has literal features such as stem and leaf but also figurative or symbolic features such as love and passion. A figurative feature can even be another metaphor. A bride's car, for example, could trigger the conceptual metaphor that life is a journey. 'Life is a journey,' then, could count as a figurative feature of bride's car (cf. 'primary metaphors' in Lakoff, 2008, p. 27).

Figurative features can also be personal. For me, lilies have nothing to do with chastity, virtue, and purity because they are white but rather with decay because they are smelly. It is my personal sentiment that flowers in a vase have nothing to do with joy of life and happiness but rather with prolonged suffering and a postponed but inevitable death.

It may seem as if I am dodging the question because it may easily be said that figurative is just another word for metaphor, which makes my account run in circles: Metaphor is explained by metaphor. The difference is in the old and the new. Figurative features are connected to almost any concept or word, whether they are part of a metaphoric construction or not. 'Rose' not only activates 'flower' but also 'passion.' Figurative in this sense is anything that is not a literal description of the entity the word refers to. These are old, conventional metaphors, steady symbols, hardly recognized as such any more. They may have come into existence through miscomprehension of natural metamorphosis and delivered to us through tradition. Perhaps not. They may be cultural, they may be personal but they are already stored in semantic memory and only highlighted (cf. Tversky and Ortony) or more strongly activated (cf. Kintsch) or 'rediscovered' when connected to similar features of another concept that are not categorized as conventional metaphors or symbols. Possibilities occur now for seeing a literal feature of a concept as a figurative feature because the other concept says so. Vice versa, what was conventionally figurative for one concept is proposed to be taken literally because the other concept suggests so. This back-and-forth of taking literal for figurative and figurative for literal playfully crosses the border between fiction and reality at the micro level (i.e. features), which makes the utterance a *novel* metaphor on the meso-level (i.e. the combination of words or images).

The feature set a word evokes, then, can be differentiated into a literal and a figurative set. However, one feature can have more references. The reference can be the literal description (l) of an aspect of an entity as well as its figurative connotation (f). The stem of a family tree refers to the trunk (l) as well as to descent (f). In other words, membership of features to literal and figurative sets is 'fuzzy' (Zadeh et al., 1975).

Figurative features do not have to be subordinate to literal features (Glucksberg, 2008, p. 70). When you read “I ♥ Amsterdam,” the first thing that comes to mind is love and not heart.

5.5 Understanding novel comparisons

There are many ways to make an expression metaphoric, for example, in the verbs (e.g., the boy tries to weasel out), the use of a symbol (e.g., the ankh sign), or by analogy (e.g., sparrows in the meadows are the grass of the skies). In this section, I will restrict myself to the simplest form of Noun1 is Noun2, because I believe that more complex forms are built of such basic comparisons. On the other hand, this directly limits the scope of the here proposed process because it does not account for all kinds of external influences such as context, linguistic form, pragmatics, or culture. For example, a metaphoric analogy may require reasoning mechanisms in addition to the basic associative comparison, but those are not discussed here.

Words evoke literal as well as figurative meanings and these are generated in parallel (Hoorn, 1997b, pp. 175–178; McElree & Nordlie, 1999). This means that literal statements such as ‘the monkey is an animal’ also provoke figurative features – perhaps at a low activation level – and that metaphors also evoke literal features. Instead of feature sets, Kintsch (2008, p. 130) would speak of a vector space with features being ‘word vectors.’ Anyway, whether comparisons are literal, metaphoric, or anomalous, a number of literal and figurative features are activated when people encounter a noun-noun construction. Note that context (even the other noun) affects which meanings are activated or suppressed (cf. Kintsch, 2008, p. 131). In a literal context (e.g., pure science), figurative features will be suppressed more than in a poem and vice versa for literal features (cf. Kintsch, 2008, p. 133; Keysar, 1994). This is the encode phase in the processing of novel comparisons (Hoorn, 1997a) (Figure 22).

In Figure 22, identifying a metaphor is seen as a race between literal and figurative information sources but the division in a literal and figurative set for each word is not unchallenged. Certain authors state that a feature set or semantic network is undifferentiated in this respect and that the information is in so-called “double-scope integration” (Fauconnier & Turner, 2008, p. 65). Authors such as Gentner and Bowdle (2008) claim that the defining type of information is the relations between the two nouns – metaphor would be a form of “structure mapping,” similar to solving analogies.

The reason why I think that the division between literal and figurative features is the most informative is that I let 40 readers (undergraduate students) of literary metaphor (e.g., “my future is a heart,” Snoek, 1982, p. 614) type in associations for the various nouns (Hoorn, 1997b, pp. 144–182). They also did this

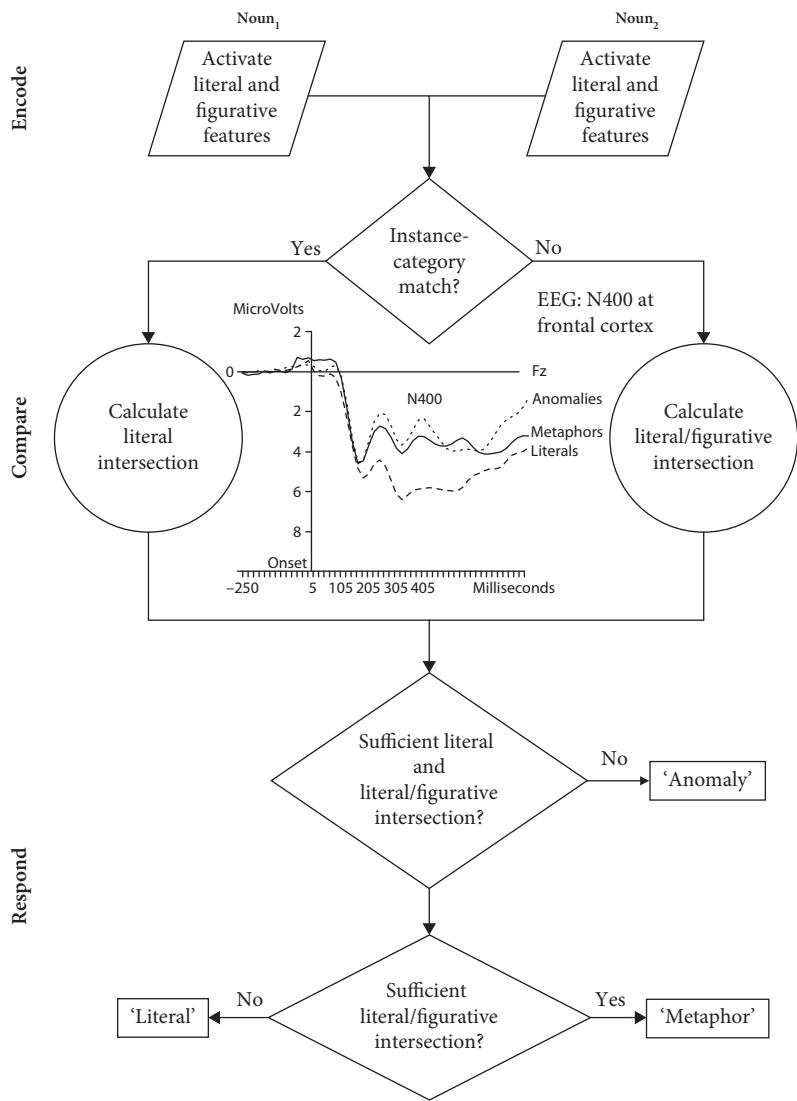


Figure 22. Understanding novel comparisons.

for the literal (“my future is a fact”) and anomalous counterparts (“my future is a clutch”). Then they divided the elicited words into literal (l) and figurative (f) features and created relations (r) between the noun and its features, as intended by Gentner and Bowdle (2008). For example, one of the participants indicated that the relation between heart and spear is death. That resulted in feature lists as illustrated by Table 1. According to participant 5, “red” was a literal description

Table 1. Features for the noun **heart** by participant 5 in the *single word* condition, categorized as literal (l) and/or figurative (f), and with relations (r) added. English translation from the Dutch.

heart
red l
body l
love f
blood l
bloodred l
nursery l sweet r
sweet f
valentine l
spear l death r
sword l death r
fight l death r
war l death r
cow's heart l
food l
dog l food r
passionate f
bosom friend f
fruit hearts l food r

of **heart**, “passionate” was a figurative feature, and the relation between **heart** and “sword,” was “death.”

Then I ran a number of computer analyses, in particular to find out which features of Noun1 and Noun2 were overlapping, establishing the intersection (or meaning relatedness) between the two nouns. I have to add that ‘intersection’ as a single mapping of features may be too simple – probably the semantic connection lies in many mappings and a more elaborate integration of semantic networks (Fauconnier & Turner, 2008, p. 53, p. 65). Yet, I basically calculated all possible combinations between the undifferentiated features of Noun1 and Noun2, between the literal features of Noun1 and those of Noun2, the figurative features of both nouns, and the combinations Noun1_{literal}-Noun2_{figurative} and Noun1_{figurative}-Noun2_{literal}. In addition, I computed the overlap between the relations of the two nouns, between relations of the one noun and features of the other noun, and vice versa, etc. etc. (Hoorn, 1997b, pp. 159–162, pp. 165–167).

Statistical analysis on the size of the various types of intersections showed that only two could discriminate literal statements from metaphors. It was neither the size of the undifferentiated intersection nor any of the intersections that included relations. They were not the amount of purely literal overlap between nouns, nor

the amount of purely figurative overlap. The only significant difference between literal statements and metaphors was in the size of the intersection between features that were literal for the one noun and figurative for the other ($\text{Noun1}_{\text{literal}} - \text{Noun2}_{\text{figurative}}$ and $\text{Noun1}_{\text{figurative}} - \text{Noun2}_{\text{literal}}$). Descriptions in the realm of one entity were regarded as figurative under the regime of the other entity. In 'love is a rose', for example, 'thorn' is a literal feature for rose but figurative for love (indicating heartache). Both literal statements and metaphors established intersections of purely literal features but metaphors, moreover, established mixed literal-figurative intersections (see the comparison phase in Figure 22).

As you can see in Figure 22, however, the comparison of features was preceded by a comparison between categories and instances, in the sense of Glucksberg (2008, p. 69), as class-inclusion assertions. I did a number of forced decision experiments while measuring reaction times and the electrocortical activity of the brain. The results suggested that before starting to compare the features of the two nouns, people checked whether Noun1 was an instance of the category described by Noun2. In 'the monkey is an animal,' monkey belongs to the category of animals and this would facilitate the calculation of the literal intersection and the inhibition of the literal-figurative route. In a metaphor or anomaly (e.g., the monkey is a clown), the instance-category mismatch would facilitate the calculation of the literal-figurative intersection and inhibit (but not stop) the parallel calculation of the literal intersection.

This position was underscored by a number of experiments, in which I measured reaction times and EEG (electroencephalogram) in response to novel metaphors and their literal and anomalous counterparts (Hoorn & Woestenburg, 1996, 1997; Hoorn, 1997b, pp. 241–253; 278–299). People with EEG caps on their heads and their fingers at the response buttons were confronted with sentences that missed the last word (the sun is a _____), after which a fixation line was projected (the sun is a _____). Then a word was projected that completed the sentence (the sun is a grape). Participants had to respond as quickly as possible by pressing either 'metaphor,' 'literal,' or 'anomaly.' The results were that anomalies were recognized fastest (a quick rejection response) and that literal and metaphoric sentences were equally fast with a slight speed advantage for those literal sentences that were never mistaken for metaphors ('pure literals') (Figure 23, Hoorn, 1997b, p. 248).

In addition, I explored the electrocortical effects of reading a metaphor because in the classic literature (e.g., Beardsley, 1982, p. 267), metaphor processing would be accompanied by a 'shock,' due to the deviant meanings of combining two unrelated nouns. In 1996, I anticipated this 'shock' in the form of the N400, a brain potential visible as a negative (N) amplitude shift in the EEG, 400 msec after sentence completion and that is supposed to reflect semantic mismatch or

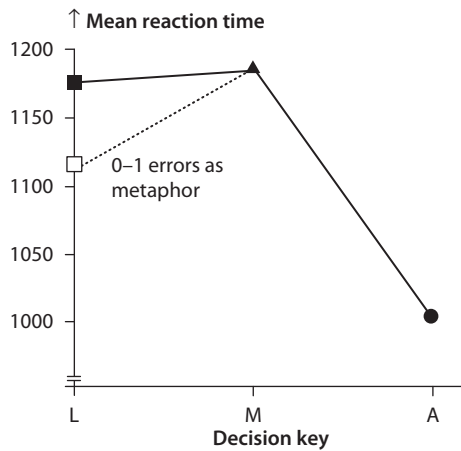


Figure 23. Reaction times for literal (■), metaphoric (▲), and anomalous (●) sentence completions. Literals (□) that were recognized no more than once as metaphor had a speed advantage.

incongruity (Kutas & Hillyard, 1980; Kutas & Federmeier, 2009). Indeed, the N400 occurred in the expected ordinal pattern, indicating that literal sentences evoked least N400-activity (no mismatch), metaphors intermediate (partial mismatch), and anomalies the largest N400-activity (big mismatch). These results were reported in Hoorn and Woestenburg (1996, 1997), coinciding with similar results for literal and metaphor found by Pynte et al. (1996).

Although certain authors did not find differences in the brain areas that process literal or metaphoric sentences (e.g., Pynte et al., 1996), I found that the difference in N400-activity between literals and metaphors took place most prominently at central left and parietal locations (the head's crown). The difference in N400-activity between metaphors and anomalies was most prominent at frontal and parietal locations (Hoorn, 1997b, p. 294). In establishing novel, non-automated meaning, metaphors are often thought to be processed in the right hemisphere (Bottini et al., 1994). For right hemispheric specialization in metaphor, I found no evidence (Hoorn, 1997b, p. 297), which was later on confirmed by Rapp et al. (2007). However, others such as Pobric et al. (2008) do show evidence for right hemispheric dominance.

The pattern for the decision times that I found from quick to slow were: anomalies < literal expressions ≤ metaphors, which did not follow the pattern for the height of the N400-amplitude: anomalies ≥ metaphors > literal expressions. I then deduced that N400 could not be the impetus for a special metaphor process (the larger amplitude would cause the faster responses) because literal and

metaphoric sentences showed the reverse (literal faster, metaphor larger amplitude). The plausible answer was that N400 followed the degree of category mismatch that the comparison induced (anomaly big, metaphor intermediate, literal small) after which the type and size of the feature intersection decided what the sentence was (literal, metaphor, or anomaly). What might be, then, is that N400 served as a signal to facilitate the special literal-figurative route above a certain height of the amplitude – read: When the instance strongly mismatched the category. This is a more straightforward conclusion than Coulson and Van Petten (2002), who claimed that N400 is part of a special metaphor process and would indicate the complexity to make a cognitive blend between the nouns (i.e. to establish semantic integration through similarity, identity, and analogy).

In the response phase (Figure 22), anomalies evoked quick rejection decisions because they do not establish sufficient literal or mixed literal-figurative overlap. Literal and metaphors are processed equally quickly although there may be a slight speed advantage for literal sentences that have no figurative interpretations at all. Literal sentences establish a literal intersection. They also evoke figurative features but do not establish a large-enough mixed literal-figurative intersection. Metaphor connects literal features to other literal features, *and connects literal features to figurative features* as well. Therefore, metaphor is richest in meaning. If we bring this insight back to impersonation as found in stage acting or to an orchid that pretends to be a bee (Figure 9), these communications are only metaphoric when they not only establish literal connections but establish figurative meanings as well in the mind of the observer.

In all, figurative meaning cannot be ignored (cf. Glucksberg, 2008, p. 70), is evoked in parallel to literal meaning, and the two information sources race each other to the response phase. The true difference between literal statements and novel metaphors is that metaphor evokes an instance-category mismatch, signaled by N400, and that novel metaphors establish extra meaning by connecting literal features of the one term not only to other literal features of the other term but to figurative features of the other term as well. That is, novel metaphor revitalizes and changes the old symbols and known metaphorical connotations of both terms by stating they could be taken literally (i.e. describe ‘reality’); novel metaphor revitalizes and changes the old descriptive meanings and known literal denotations of both terms by stating they could be taken metaphorically (i.e. describe an imaginative world). Over time, novel metaphor can of course become conventional and be part of a novel metaphor again as a figurative feature.

As a final remark, the processing of novel comparisons in Figure 22 and the forced decision task that rendered the results of Figure 23 are depicted as a series of binary decisions, which is artificial. This may be a must for experimental reasons and a merit for the sake of comprehensibility but the boundaries between

such demarcations are fuzzy (Chapter 1). The reaction time data of Figure 23 already show that people sometimes mistook literal statements for metaphors. In the next chapter, a signal detection account of decision making takes care of this kind of uncertainties.

6. Seven types of metamorphosis

Section 5 elaborated the thought that metamorphosis makes metaphor acceptable under Rule 3, while incrementing its meaning relatedness through feature transformations so that more literal features of the one entity could connect with figurative features of the other. Earlier in this chapter, we saw that metamorphosis can be truly happening in the physical world or falsely, and then it creates a fiction. False metamorphosis can express itself as an impersonation or as a metaphor. Impersonation has no extra meaning attached that goes beyond the literal depiction of another entity. Metaphor attaches extra references to things that go beyond literal description (e.g., symbols, abstractions, imaginative worlds).

Because there are three criteria that determine whether a metamorphosis is true or not and two truth values on each of these criteria (yes, no), there are $2^3 = 8 - 1 = 7$ possible types of metamorphoses, depending on the combination of *yeses* and *no-s* scored on the criteria. The minus 1 accounts for the case in which the transformation fails on all criteria (three times ‘no’) and thus, cannot be considered a metamorphosis. Table 2 shows a number of examples that are checked for the three criteria by which we can claim that a given transformation is a true metamorphosis or not. The table works according to someone’s personal belief system so that certain cases are sometimes doubtful, for example, whether one feels there is enough dissimilarity between two stages.

Table 2 provides a precise distinction among various sorts of fictional devices, all of them rooted in the same principle of metamorphosis. Epistemic appraisals of the expressions of metamorphosis that Table 2 shows, derail fixed ontological classification of the belief system. Seemingly unrelated forms such as impersonation and stage acting, (fake) identity and phishing, as well as metaphor can be traced back to certain aspects of the seven types of metamorphosis that are responsible for the derailing effect on the belief system and that are responsible for producing fiction. Table 2, therefore, is also a set of test predictions, a starting point to gather data, or a framework to reinterpret earlier results.

Table 2 shows that metamorphosis does not have to be human and is not restricted to living organisms. When the sun grows old, it becomes a red giant, which later on becomes a white dwarf. A living person becomes a dead body and decays. A drinking glass that is shred to pieces is not recognizable as a drinking

Table 2. Types of metamorphosis.

	Sufficient dissimilarity?*	Transformation irreversible?	Entities refer to same higher-order categories?	
True metamorphosis				
<i>Non-human</i> (Rule 1)				
Larva becomes silver eel	y	y	y	eel
Polyp becomes jellyfish	y	y	y	jellyfish
The sun becomes a red giant	y	y	y	stars
Red giant becomes a white dwarf	y	y	y	stars
Male anemone fish becomes female	y/n	y	y	fish
Glass breaks	y/n	y	y	glass
<i>Human</i> (Rule 1)				
Morula becomes old man	y	y	y	humans
Living person becomes dead body	y/n	y	y	humans
<i>Human</i> (Rule 3)				
Boys become transgender girls	y	y/n	y	humans
Fan becomes Angelina Jolie	y	y/n	y	humans
False metamorphosis				
<i>Non-human</i> (Rule 1)				
Ice melting, water evaporating	y	n	y/n	y = all 'water', n = solid≠liquid≠gas
<i>Non-human</i> (Rule 2)				
Butterfly pretends to be tree leafs	y	y	n	insect≠tree
Orchid pretends to be insect	y	y	n	flower≠insect
Snapping turtle tongue pretends to be worm	y	y	n	turtle≠invertebrate
Snail tentacles pretend to be caterpillars	y	y	n	snail≠insect
Cuttlefish male pretends to be female	y	n	y	cuttlefish
Mimic octopus pretends to be a lionfish	y	n	n	mollusk≠fish
<i>Human</i> (cf. Method Acting, Rule 3)				
Patrick Stewart pretends to be Captain Picard	y	n	y	humans
Picard** becomes Locutus (a Borg)	y	y/n	n	human≠machine
Ross Hamilton pretends to be Marjorie	y	n	y	humans
Bookkeeper pretends to be Elvis	y	n	y	humans
Bookkeeper pretends to be a jousting knight	y	n	y	humans

Table 2. (continued)

	Sufficient dissimilarity?*	Transformation irreversible?	Entities refer to same higher-order categories?	
Stage actor pretends to be politician	y	n	y	humans
Actor Reagan becomes/pretends to be politician	y/n	n	y	humans
<u>Identity theft</u> (Rule 2)				
Phisher pretends to be Woody Allen	y	n	y	humans
<i>Non-human</i> (Rule 2)				
<u>Non metaphoric</u>				
Caterpillar pretends to be snake	y	n	n	insect≠reptile
<u>Metaphoric</u> (Rule 3)				
Lava pretends to be toothpaste	y	n	n	toothpaste≠stone
Morning pretends to be sheet of paper	y	n	n	sunrise≠paper
<i>Human</i> (cf. detached acting, Rule 3)				
<u>Non-metaphoric</u>				
Gamer pretends to be an anime hero	y	n	n/y	human≠drawing
Patrick Stewart pretends to be Locutus	y	n	n	human≠machine
Actress pretends to be a bear on stage	y	n	n	human≠animal
Hunter pretends to be a tree	y	n	n	human≠tree
Naomi pretends to be an orchid	y	n	n	human≠flower
Medusa's** hair pretends to be snakes	y	n	n	body part≠reptile
<u>Mistaken identity</u> (Rule 3)				
Stunt double pretends to be Roy Rifkin	n	n	y	humans
<u>Identity theft</u> (Rule 2)				
Twin pretends to be his brother (dressing up)	n	n	y	humans
Twin pretends to be his brother (plastic surgery)	n	y/n	y	humans
<i>Human or non-human</i>				
Transmigration of souls – reincarnation	n	y/n	n	e.g., human≠animal
<i>No metamorphosis</i>				
<u>Mistaken identity (replica)</u>				
Kevin Warwick pretends to be a cyborg	n	n	n	human≠machine
Robot pretends to be inventor Zou Ren Ti	n	n	n	human≠machine

* Based on subjective sensitivity and tolerance

** Stage 1 refers to non-existent entity

y/n Doubtful cases

glass any more. Of course, how much dissimilarity someone perceives between the stages is personal; there is something like a subjective sensitivity and tolerance to say that two stages differ (see Chapter 4).

A case in point is ice melting or water evaporating. Perceptually, the two stages differ quite a bit but the transformation is reversible. Yet, the higher-order category one applies depends on the sophistication of the belief system. Most people would consider mist, water, and ice part of the same category of 'water.' Scientists might think that the different organizations of H_2O molecules categorize them as either gases, or liquids, or solids. As a consequence, ice melting and water evaporating involve a 'false metamorphosis' and generate a fiction, perceptually. It is not intuitively clear that ice is mist in another form. People find it strange to state that clouds and rain are manifestations of each other. They have to make an effort to realize that. It is raining from the clouds, not the clouds are changing into rain. The fiction is that we incline to take ice for something different than clouds and rain for something different than a lake. A lake is a cloud fallen down. Fiction is not intended by the metamorphosis of the combinations of H_2O molecules but it is effectuated by our interpretation of their outer appearance, biased as we are by the fixed categorizations in our belief system.

Given that the level of perceived dissimilarity is high enough, that the transformation cannot be reversed, and all higher-order categories are shared, a true metamorphosis scores a triple *yes* on all Criteria I–III. Such metamorphoses will be regarded by the observer as a part of reality. True metamorphosis can be observed in living things as well. Examples are the development from morula to old man and from old man to dead body, the life cycle of eels and jellyfish, or the top male anemone fish that becomes female to take over from his dead queen.

As soon as the transformation scores a *no* on one of the criteria, we enter the realm of fiction. A doubtful case is, for example, a transgender girl, the complete make-over of the Angelina Jolie fan, or Calpernia Addams. Is the transformation irreversible like the "*Protogynous hermaphroditism*" of fish is? If it is, we can speak of true metamorphosis, else, of a form of Method Acting (y-n-y) in which the actor tries to completely identify with the character.

False metamorphosis does not have to be human as well. The Indian leaf butterfly claims that her wings are two dead tree leaves (Rule 2) although wings and the reference to leaves do not share the same categories. So yes, there is dissimilarity between wings and leaves, and yes, as an individual she cannot evolve normal wings again but no, wings and leaves do not refer to common categories – this is the way she puts up a fiction. Our ontological classification of this particular instance as a butterfly is challenged by the reference to tree leaves and, therefore, her statement is not true despite its realistic appearance. The same reasoning applies to the European fly orchid, who claims that as a flower, she is an insect (y-y-n)

with more or less realism. This reasoning also applies to the Alligator snapping turtle (Chapter 6), who's wiggling tongue looks like a worm to attract prey fish (y-y-n) or to the flatworm (Introduction) that makes snail tentacles look like caterpillars.

It may also be that categories are shared but that the transformation is reversible. In the case of the male cuttlefish who claims to be female (Rule 2), the observer (the other male cuttlefish, not us) perceives sufficient dissimilarity between the entities, all categories are the same (they are all cuttlefish), but the 'female' can easily turn back into a male once it gets to fertilizing the eggs (y-n-y). In a human form, Method actors attempt to do the same with the exception that Rule 2 is exchanged for Rule 3. Ross Hamilton invites us to imagine he is Marjorie but he can change back into Ross pretty easily by undressing (y-n-y). The bookkeeper plays Elvis at the Sahara, Las Vegas, or a knight at the festival in Leeds but the very next day, he is the bookkeeper again, going to office (y-n-y).

Figure 24. Triple metamorphosis. Actor Stewart plays Captain Jean-Luc Picard who becomes a Borg.



A triple (false) metamorphosis takes place when the actor plays that he is going through a transformation. Patrick Stewart playing Captain Picard in Star Trek is submitted to the same type of metamorphosis as the bookkeeper playing Elvis (y-n-y). However, in *The Best of Both Worlds, Part I*, Picard (not Stewart) is "assimilated" by the Borg community, who make him a cyborg called Locutus (Figure 24), a machine that cannot work without human functions and a human who cannot live without its machinery. In *First Contact*, however, the transformation from Picard into Locutus turns out to be only partially reversible, some parts of the machinery stay in Picard (y - y/n - n). That, of course, is a different transformation than Stewart playing Locutus, where the transformation is reversible (take off robot make-up) (y-n-n). Because Picard is an entity in the equation that does not refer to something existent in the physical world, it is possible to suggest that the restoration into a human is incomplete, something you cannot do with the other two transformations.

1. Stewart plays Picard (y-n-y)
2. Stewart plays Locutus (y-n-n)
3. Picard becomes Locutus (y - y/n - n)

Another interesting case of metamorphosis is when an actor takes on a new role in society. The actor who plays president Obama on stage merely has to put off

his mask to show that the transformation is between (the reference to) two different people (y-n-y). The actor Ronald Reagan becoming the president of the United States, however, is a doubtful case (y/n – n – y). It all depends whether the observer acknowledges that there is enough difference between the person as an actor and the person as a politician. After all, it is the same person (similarity high) and the transformation can be reversed at any time. Therefore, the transformation can never be a true metamorphosis and people will wonder whether Rule 2 or Rule 3 applies. Does he lie or does he act? Using a former actor as politician, then, may not be the most credible choice because he can only speak the truth under Rule 3.

If Rule 2 applies to false metamorphosis in the form of human impersonation, we are speaking about identity theft or fake identities. The phisher who pretends to be Woody Allen does not do anything different than the bookkeeper playing Elvis or the actor playing president Obama (y-n-y). However, the phisher does not want to provide any cues to his act being fiction and that is what makes him or her a liar.

Next we enter the part of Table 2 where the number of *no*-s is higher than the number of *yes*-es. The caterpillar's tail that does its snake performance (Rule 2) is different from, for example, the snapping turtle's tongue (Rule 2) because the tail can turn back into its original form (y-n-n), whereas the tongue cannot (y-y-n). The snapping turtle is close to Method Acting. Offstage, when not hunting, he can hardly be any different. The behavior of the caterpillar resembles more a form of detached acting. Likewise, the camouflaged hunter stands perfectly still and performs a tree, the actress plays she is a bear or Naomi Campbell acts like an orchid but she keeps a healthy distance – she does not become one with the character or the entity she performs – it is a hat put on or off (y-n-n). Out-of-category transformation forces the actor to a more distant style of playing. A doubtful case may be the self-perception of the gamer who loses himself in the first-person character he plays. Although the outside observer clearly sees the difference between human gamer and digital character (y-n-n), the gamer may believe he *is* the character (y-n-y) – the Method actor's trap.

Metaphors such as 'lava is toothpaste' implicitly state that there is a potential for metamorphosis (Rule 3) – make the toothpaste black, scorch it, squeeze it out of the tube, and the intersection of features helps the imagination to see the transformation happening. However, because there is a physical problem in turning toothpaste into lava or lava into toothpaste, the transformation is easily reversed or even denied (y-n-n). Similarly, Ovid invites us (Rule 3) to see fair Medusa's hair turn into snakes but because there is a physical challenge, the reversal of the transformation takes little effort (y-n-n).

When similarity is high between two entities, it is hard to assume that a transformation has happened let alone that it can be reversed. This is where identities can become mistaken, in the case of Roy Rifkin's stunt double (n-n-y), this is not harmful (Rule 3 applies) but in the case of the identical-twin brother cheating on his teacher, it is (n-n-y) (Rule 2 applies – identity theft). The twin brother can do this in two ways – by acting like his brother (put on the same clothes, same hair cut) (n-n-y) or by a more drastic transformation, plastic surgery, that takes away the last differences (n-y-y).

A hard case is the transmigration of souls or reincarnation. In the Hindu belief system, for example, the metamorphosis of a human into an animal changes the categories one belongs to but the soul remains the same. The hardest part is whether one believes that the transformation is irreversible. Within the span of a life cycle it is (n-y-n) but between life cycles it is not, one can change back into a human again (n-n-n).

No metamorphosis has taken place when three *no*-s are scored on the Criteria I–III. Due to high similarity between the entities that the comparison refers to there can be a mistaken identity but never as a result of metamorphosis. British scientist Kevin Warwick may pretend to be a cyborg but when you take out all of his machinery, the human organism will live on. He does not impersonate another being. He stays the same person and puts on some add-ons like someone who wears precious jewelry. The robot that looks exactly like Zou Ren Ti (Figure 16, right) is high on similarity but between the two entities (human and machine) no transformation took place (n-n-n). The metamorphosis that did take place was directed at the metal and silicon parts which, together, were transformed into a humanoid robot (y-n-n).

6.1 Metamorphosis in the theory of fiction

Table 2 illustrates that a number of phenomena in fiction can be explained from the assumption that false metamorphosis is the guiding principle. False metamorphosis is a process of transformation that outputs an impersonation, mistaken identity, metaphor, or identity theft under several preconditions. Metamorphoses such as metaphor and the transmigration of souls are purely conceptual, at least to a critical-rationalist mind. False metamorphoses of organisms that are not purely conceptual relate to some form of acting. The more conceptual metamorphoses do not relate to acting. In other words, as soon as false metamorphosis of organisms materializes in the physical world, someone is putting up a show.

Performance or acting is constructing a non-existent being, realistically or not. When the actor mimics an existing being, the performance becomes an

impersonation. The type of acting may be detached, which deliberately shows the difference between reality (the actor) and the fictional world (the character). Method Acting attempts to make the difference as small as possible, to make the false metamorphosis look like a true metamorphosis, so that in taking the actor for the character, the observer does not see two entities but one.

Under Rule 2, proper Method Acting can easily lead to mistaken identities on the side on the observer. In terms of Table 2, the observer perceives low dissimilarity between the two entities and misses that the transformation is reversible. Under Rule 3, that same mechanism leads to identity theft on the side of the performer.

Hence, as related to organisms,

- a. If false metamorphosis is conceptual, it is a metaphor
- b. If false metamorphosis becomes concrete, it is an acting performance
- c. If the end state of a false and concrete metamorphosis refers to a (once) existent being, this is an impersonation
- d. In the case of Method Acting, b and c lead to identity theft under Rule 2
- e. In the case of Method Acting, b and c lead to mistaken identities under Rule 3

However, **a** and **b** have a consequence that may not be true. If both are valid and nothing else applies, it means that every actor always performs a metaphor. Although I doubt it, this may be true for theater acting but not for the hunter pretending to be a tree, the orchid pretending to be an insect, or the liar who says he is Woody Allen. Thus, the surface form is similar to a metaphor “the hunter is a tree” or “an orchid is a bee,” but there is no extra meaning intended nor perceived.

6.2 Form and meaning

In metaphor, the observer is aware of the two entities in the comparison, which proposes to imagine that one of the entities becomes the other. Beyond this form transformation, however, the metaphor also pretends that the proposed false metamorphosis has extra meaning attached to it.

In other words, metaphors put two entities on a par, one transforming into the other with an extra meaning intended. “This boy is a mule” proposes to see a boy in the form of a long-eared animal with the extra meaning attached to it that the boy is stubborn. In novel metaphors such as the “Morning is a new sheet of paper for you to write on” (Merriam, 2004), the intended meaning may be less

obvious and more open to personal interpretation by the receiver (e.g., everyday is a new beginning to make something out of your life).

As stated in the beginning of Section 3, metamorphosis includes a comparison – else the transformation is not recognizable. Comparisons during or after false metamorphoses become metaphoric only if they communicate figurative meanings or are interpreted as such. When false metamorphosis has meaning beyond the description of the transformation process or the observation of equality between two entities – irrespective of this statement being true or false – it is a *metaphor*.

Without the extra meaning, the statement is *literal* if the description or observation is true according to a certain belief system. For example, in “A monkey is an animal” or “This larva becomes an eel,” it is merely stated that both entities refer to the same higher-order categories, which is true. Thus, all true metamorphoses within a certain belief system make statements that are literal, although it is sometimes hard to believe that entities belong together when there is high perceived dissimilarity. Yet, literal statements such as new scientific hypotheses or technological blueprints describe things that are or can be really out there in the physical world.

If the two entities in the comparison are out-of-category but the meaning relatedness is too thin and no extra meaning is intended nor perceived, the statement is false according to a certain belief system. Such a statement, which has neither literal nor figurative meaning, is considered *anomalous* (e.g., “The sun is a whit”). This is different from a false literal statement, where there is meaning relatedness although the relation is incorrect (e.g., “Penguins can fly”). In a false literal, there is a wrong connection; in anomaly, there is no connection.

Literal statements describe the transformations or states of entities as they are, according to belief. That does not mean that literal statements cannot be used in fiction. If someone on Second Life says “I am a bar tender in my real life,” this may be literally true. Characters telling they love each other, say nothing metaphoric. It is fictional, it is make-believe, it may evoke emotions, but it is a literal statement. Literal statements in fiction add to the level of perceived realism.

Metaphors and anomalies imply or render fiction because the metamorphoses they propose are false. Anomalies, however, do not escape from rejection. The two entities have too many distinctive features, do not communicate extra or other meaning than the transformation itself or the state-of-affairs of the entities, and that assertion, moreover, is false according to belief. Hence, the following rules supplement the metamorphosis Rules 1 up to 3:

- 4a. If false metamorphosis is conceptual and conveys meaning beyond mere description, it is a metaphor
- 4b. If false metamorphosis is conceptual and does not convey meaning beyond mere description, it is an anomaly
- 4c. Descriptions of the states or transformations of true metamorphoses are literal statements

Impersonation is a form of acting that is not necessarily metaphorical. By consequence, acting is always showing the process of or the net result of the transition of *forms*. Through copying, a transfer of features from a contemporary or historic figure takes place (e.g., Elvis), pasted onto a target (the actor), and the combination or blend of features from actor and historic figure creates an image (the performed Elvis). For people unaware of the fiction-reality confusion, parts of the image stay with the actor off-stage. Reversely, through the image, parts of the actor are attributed to the historical figure. Many people in the older audience cannot imagine Spartacus without the face of Kirk Douglas (Kubrick, 1960). Impersonation is the end state of a false and concrete metamorphosis of forms that refer to a (once) existent being.

Acting can become metaphoric when meaning is intended by the sender or perceived by the receiver beyond the description of the transformation process itself or beyond the observation that two entities seem equal on certain dimensions. If an actress colors her face white to express the virtue of the heroin, this goes beyond stating that the heroin has a light skin. Beijing Opera, for instance, is packed with this kind of symbolism. When impersonation is used as a metaphor to express an abstraction, we speak of a personification. Personification is a fictional character that is used as a metaphor for an abstraction, such as The Reaper who symbolizes death (see Chapter 5).

As a complement to the earlier rules, then:

- 5a. If false metamorphosis becomes concrete and is restricted to form, it is an acting performance
- 5b. If false metamorphosis becomes concrete in its form and conveys meaning beyond mere description, it is an acting performance with a metaphoric twist
- 5c. If 5b is used to symbolize an abstraction (e.g., love or death), we speak of personification
- 6a. If the end state of a false and concrete metamorphosis that is restricted to form refers to a (once) existent being, this is an impersonation
- 6b. By rule 5c, an impersonation can become a personification

7. In the case of Method Acting, 5 and 6 lead to identity theft under Rule 2
8. In the case of Method Acting, 5 and 6 lead to mistaken identities under Rule 3

In sum, there are seven types of metamorphosis, one of which is true and the rest false. In true metamorphosis, which happens in the physical world and is considered ‘reality,’ the observer believes that there is sufficient difference between the two stages in the transformation process, that the transformation is irreversible, and that the entities in the different stages, according to the classification system of that observer, are part of the same physical (i.e. biological) first-order and higher-order categories. A false metamorphosis does not meet one or two of these criteria and in failing, is an instrument of fiction and creation. Impersonation, the art to assume the character of someone else, is a fine example of false metamorphosis because the transformation can be undone. If all three criteria are challenged, we cannot speak of impersonation but have to speak of someone putting on a hat or wearing jewelry. The ‘as-if’ disappeared, the fiction element is gone.

Metamorphosis is not only at the basis of impersonation but also of metaphor. Because we are acquainted with metamorphoses, we are ready to accept metaphor. The difference between impersonation and metaphor is that the first pertains to form and the latter to form *and* meaning. The quintessence of metaphor is that not only the literal senses of two seemingly unrelated concepts are connected but that these literal senses are also connected to figurative senses (personal or conventional signs, symbols, and abstractions). The figurative sense of a concept goes beyond pure description and refers to things other than literal denotation. This way, metaphor fires up our imagination and launches our understanding out of conventional ontology into new insights: It helps us to become creative.

7. Metamorphosis in the fiction-reality framework

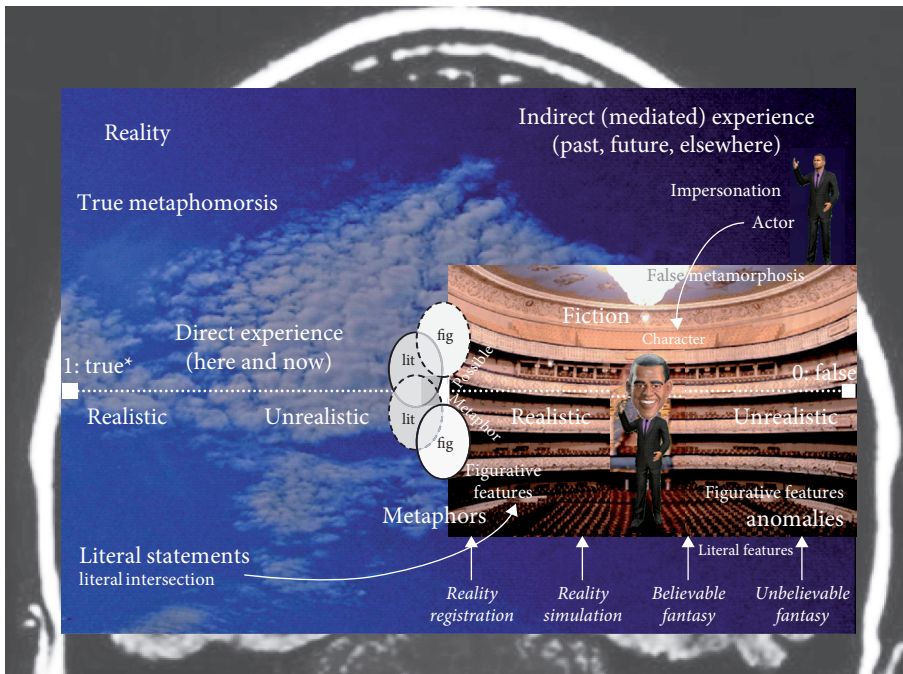
Metamorphosis can be true or false, and therefore, penetrates from reality into fiction. True metamorphosis is in the Reality domain of Figure 25, but if a metamorphosis is observed or heard of for the first time, it is on the side of ‘probable’ rather than ‘true.’ Depending on how ‘weird’ the (process of) shape shifting looks, this may be judged as unrealistic in appearance (‘I can’t believe that a willow-leaf larva finally evolves into a silver eel’).

False metamorphosis initiates Fiction (Figure 25). The ‘information carrier’ such as the words in Ovid’s narrative poem or the actor who impersonates Obama is an aspect of Reality but the entity in the end stage of the transition (the performed Obama) is fictional. Picasso turning handle bars and saddle into a bull’s

head works from Reality (i.e. the bike parts) to Fiction (i.e. the representation of a bull). Here also, the entity in its end stage may vary in realism. The Obama mask is unrealistic; the butterfly wings that look like dead leafs are realistic, Picasso's bull's head shows it is made of bike parts.

What is described in literal statements is supposed to be 'true' and regarded as Reality in Figure 25. As indicated in Section 5.5, literal statements evoke both literal features as well as figurative features but the latter hardly contribute to the meaning of the literal statement. Nevertheless, the figurative features of a literal statement do connect the statement to the Fiction domain, although that aspect is usually ignored by sender and receiver. Literal statements can also be used in fiction and then they contribute to the number of realistic features observed (cf. documentaries) and may give rise to misattribution of truth (cf. news items).

Anomalies are nonsensical statements, because the receiver cannot connect the two terms in the equation. The single words evoke literal features, which ties anomalies to Reality. Because the meaning-connection between the two sets of



* Note: According to belief.

Figure 25. The place of metamorphosis, impersonation, and metaphor in the fiction-reality framework.

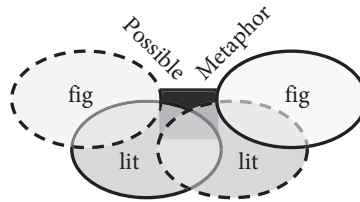


Figure 26. The metaphor butterfly.

literal features fails, they are ‘false.’ The single words also evoke figurative features but they too cannot be connected, neither with each other nor with literal features. Figurative features attach anomalies to the Fiction domain but because the figurative features are unconnected to the literal features, they do not form metaphors.

False metamorphoses create fiction and metaphor gives extra meaning to it. Novel metaphors typically function on the edge of Reality and Fiction and make us contemplate what is probable and possible. They are loved by scientists and artists. In Figure 26, the ‘butterfly of metaphor’ is depicted to emphasize that we accept metaphor as the poetic license (cf. the underdetermination thesis) to assume that anything can be morphed into anything else because we understand that natural shape shifting is possible (i.e. the life cycle of the butterfly).

Figure 26 shows that four feature sets are evoked by a metaphor: A literal (dark gray) and a figurative set (light gray) for the first entity (drawn ellipses) and a literal and figurative set for the second entity (dashed ellipses). The antennae of the butterfly illustrate that metaphor explores through fiction what may be possible in reality. Placed back in Figure 25, the metaphor butterfly points out that the literal features of both entities are connected, which roots the meaning of the metaphoric expression firmly into Reality. Yet, the literal features are also connected to figurative features, flying back-and-forth the reality-based meaning into the realm of Fiction with more and new meaning connections than any other form of conceptual thinking can bring.

CHAPTER 4

Illusions and deviation tolerance

“Illusions commend themselves to us because they save us pain and allow us to enjoy pleasure instead. We must therefore accept it without complaint when they sometimes collide with a bit of reality against which they are dashed to pieces.”

(Freud, *Reflections on War and Death*, 1918)¹

The present chapter offers a signal-detection account of decision making in the fiction domain. Ontological classification, the fiction-reality confusion, the perception of metamorphosis; these phenomena are all liable to the effects of signal strength, personal sensitivity, and tolerance levels to determine in or out, yes or no, true or false. We look into the mechanism that regulates individual tolerance to find out that when the signal-to-noise ratio approaches one (1), illusion transpires. This chapter also shows that perceptual illusions are necessary for us to effectively navigate the world; hence, trusting on fiction as if it were reality is our second nature. We will look at the creation of illusions from a data-driven as well as a more conceptual level and then I will incorporate our findings in the fiction-reality framework.

1. Illusions in the experience of fiction

In Chapter 1, the occurrence of the fiction-reality confusion was based on features and behaviors of a fictional being or scene that were so realistically depicted that data-driven processes (i.e. epistemic appraisals) overpowered the conceptual *status quo* of the belief system. This was said to be the process that made people beat up actors or believe a fake documentary.

The current chapter explores how a decision for fiction or reality is made and to what degree a work of fiction has illusory elements. As in the previous, the notion of fiction I use is not limited to the traditional arts but pertains to anything that does not come from direct experience and is at least in part not referring to

1. Retrieved May 10, 2009 from http://thinkexist.com/quotation/illusions_commend_themselves_to_us_because_they/219250.html

existing things in the physical world, according to someone's beliefs. Thus, animals and plants also can create fiction through, for example, camouflage and mimicry. In the same vein are illusions neither limited to the domain of arts and entertainment nor to the minds of mentally disturbed people. Almost everything we do is based on illusions but we are so used to them and they have proven to be so reliable, consistent, trustworthy, and non-threatening that we do not recognize them as such anymore.

2. Illusions in perception

There are many books on the market, compiling numerous examples of optical illusions and explaining the perceptual backgrounds (e.g., Seckel, 2006). Interesting as may be, I will not go into detail about the specifics of this kind of illusions; the only point I want to make is that switching between two interpretations of a given situation is regulated by the features designed in the stimulus (the cues it provides), by how sensitive a person is to pick up those cues (together, the 'signal'), and after having done that, how tolerant one is to making one kind of mistakes or the other.

Please look at "the woman with the amazing eyes," who seems to be asleep (Figure 1). Focus on her eyes and after staring for a while, you will find that she looks up and stares at you!



Figure 1. Woman with amazing eyes (1889).

The effect occurs because the brain reinterprets the incoming data. Staring at the eyes causes some cells in the retina that have sensitivity for one color to become tired and these cells stop sending signals to the brain. At that time, cells with sensitivity for another color become dominant and the eyes of the woman are reorganized according to those – now dominant – signals. Although the data remain the same, we focus on what becomes salient in contrast to the background and interpret it such that the new signals are in line with our predefined concepts: From eyes asleep to eyes wide open. Even if that leads to an obvious illusion, we cannot avoid doing it. Although conceptually, we know that the change is impossible physically, we cannot help but see it happen at a data-driven level and adapt our conceptualization accordingly. As soon as we can detect enough organization, the signal stands out against the background noise. We trade chaos for conceptual

alignment and fill out conceptually whatever data are missing. The underdetermination of our theories allows that data are interpreted creatively, resulting into multiple worldviews. That it is hard to counter a fixed interpretation of a situation is well-illustrated by Dalí's *Slave Market* (1940) (Figure 2).

Figure 2. S. Dalí. *The Slave Market with Disappearing Bust of Voltaire*.



If you move your head really close to the two nuns in the center left of the painting it is hard to see the head of Voltaire, even if you know he is there. Then move your head back and you will actually perceive the switch from local perception of features to a more global perception of features. Now it is hard to keep seeing the nuns because the interpretation of the head of Voltaire is dominant. The nuns are now backgrounded and Voltaire's bust is the focal point. Because the features in the painting can be organized in two ways (nuns or Voltaire), personal sensitivity and tolerance determines how you organize them, making it really hard to see both organizations at the same time.

To a large extent, we see what we want to see. This is typically true for the recognition of faces. Being the social animals that we are, our brains have specialized areas to recognize faces (e.g., Moeller, Freiwald, & Tsao, 2006) and certain researchers even claim that we reserve a cell for each face that we see (Quiñero et al., 2005). We see faces where there are none but that is because we would not want to miss one and overlook significant others such as the boss, a possible lover, or an enemy. We are so biased towards face perception that we are capable of seeing faces in about everything (Figure 3) and all these illusions can be very useful for communication (cf. emoticons :-D).

Figure 3. Face recognition in arbitrary patterns: Happy coffee (a), emoticons (b), Indian Head Rock (c), and the Face of Mars (d).



Mimicry makes use of the biases in the perceptual system. Once the color patterns are identified as an owl's head (Figure 4), predators probably have a hard time discovering that they deal with a butterfly's wings.

Figure 4. Owl butterfly. Once you see the eye, you lose track of the wings.



We also have a good sensitivity for emotion expression in faces. We perceive changes in expression even if we know that these changes cannot be real. Psychologists Schyns and Oliva (1999) created images of a man and a woman. Take a close look at their faces in Figure 5. One looks angry and the other friendly.



Figure 5. Changes in emotion expression and gender.

Now move back and keep looking at those faces. The woman changes into a man and friendliness becomes anger. However, it is probably the change in emotions that you perceived and not the gender transition. Sensitivity for changes in emotion expression is higher than for changes in gender.

Schyns and Oliva explained that the two categorizations gender vs. friendliness work against one another. Each image in Figure 5 has a coarse and a fine spatial scale, representing either the woman or the man. By zooming in or out, one or the other organization becomes salient according to personal sensitivity. In one situation, the female face emerges from the background and becomes the focus of attention whereas in the other situation, the male becomes foregrounded. For me, the upshot is that being a friend or a foe (good or bad) seems to be a more important categorization than gender, which is probably strengthened by the belief that moods change more easily than gender does. In other words, we focus on changing moods rather than changing gender, because the gap between the two gender types seems wider than between moods.

3. From 3D illusions to virtual worlds

Our vision in three dimensions is principally based on illusions. The projection of objects on the retina actually is in two dimensions (horizontally and vertically). Depth has to be interpreted from all kinds of cues.

We have two eyes because the most important way to estimate depth is to perceive the environment from more angles. The top part of Figure 6 shows sample stereoscope photographs from The Great Western View Co. shot by a camera with double lenses.

If you compare the first with the second photo of the Eavesdroppers, you see a slight difference in angles. For example, on the first picture the house is incomplete as compared to the second. Also the eyes perceive an environment under slightly different angles and the two images that enter the brain are integrated into one 3D scene (parallel perception).

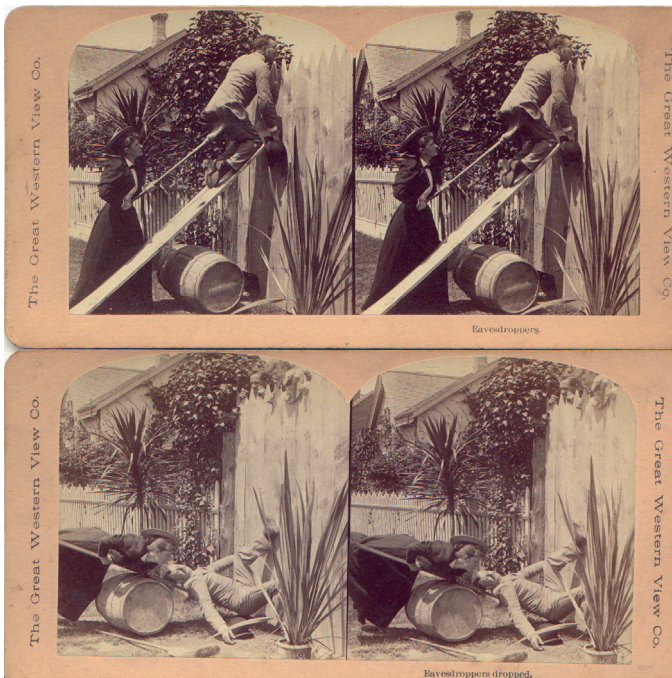


Figure 6. Eavesdroppers and Eavesdroppers dropped (personal collection). Stereoscope (a), viewmaster (b), PokeScope® 3D Viewer (c), transparent Vuzix Wrap 920AV video-glasses (d).



Using a stereoscope (Figure 6, a), each eye perceives only one picture, which was shot under a slightly different angle from the other. The slightly different angles of the same picture are a cue to depth as compared to the known situation of the flat surface of the stereoscopic card. Depth becomes salient and the brain integrates the two 2D pictures into a 3D scene because it is used to creating that illusion all the time.

Figure 6 shows the development of 3D viewers from the 19th century wooden stereoscope (a) to the Vuzix virtual reality goggles of today (d), all making use of the same principle. The Vuzix goggles display virtual objects and scenes superimposed over the user's normal view of the world, which makes it even harder to separate the artificial illusion from the natural one of depth (cf. Chapter 2: “augmented reality”).

In comparison with the first photo of Figure 6, the scene where the Eavesdroppers dropped illustrates the way we perceive motion. There is a change in position (not necessarily in viewing angle) and the sequence is serially processed.

Between the two fixations, the brain conceptually fills out what it never perceived, according to what can be expected from the belief system.

The brain also uses motion as a cue to derive depth from a scene. If you look at the moon, for example, the light falls through the lens of the eye and is projected upside down on the retina (the brain flips the image back again). If you also look at a dog that stands right in front of you, it is projected on the retina as well, wrong side up.

The left panel of Figure 7 shows that if your eye moves past the dog with the moon in the background, the sitting dog actually ‘moves’ more on the retina than the moon because the length of the projection path of the dog on the retina is longer (drawn arrow) than that of the moon (dashed arrow). The object closest to the eye ‘moves’ the most because the retinal path is longer. The brain interprets this as: Short path is behind long path; therefore, there must be depth.

In the middle panel, the eyes are kept steady and both moon and dog pass by. On the retina, the same happens as in the left panel. The dog, which is closest, leaves a longer path on the retina than the moon. If things move horizontally, the object closest to the eye seems to move most because the retinal path is longer. The brain uses the same heuristics as when the observer moves: Short path is behind long path; therefore, depth. Because the imprint on the retina is exactly the same when objects move or when you move, the cue that signals that there is depth is the same. This is alright to see depth because the distance is the same whether the observer moves or the object.

As a cue to who is moving, however, a conflicting interpretation between the two naturally-occurring depth illusions happens. In both cases, the estimation of depth is the same but is it because the others moved or the observer? This way, the ‘train illusion’ can transpire. If at the station, you look out of the window of your train onto another train and that other train starts moving, you may think that your train is leaving although in fact you stand still. You cannot tell by the lengths of the retinal paths (cf. Box 1).

Imagine that you bike at night and look at the moon behind the trees, while you come across a dog standing in the bike lane. You ride by and wonder why you leave the dog behind while the moon travels with you all the way. This may be an endearing thought but in fact it is an optical illusion. If you fixate on a focal point in the landscape (a tree) while driving by (Figure 7, right panel), the object in front of the focal point (the dog) moves into the opposite direction of the observer, whereas the object behind the focal point (the moon) seems to move into the same direction (the landscape ‘turns’ around the vertical axis). This motion parallax is interpreted by the brain as: The direction in which an object leaves the visual field indicates the direction of object motion in the physical world; therefore, the moon is traveling with me (which is not necessarily true). Thus, the

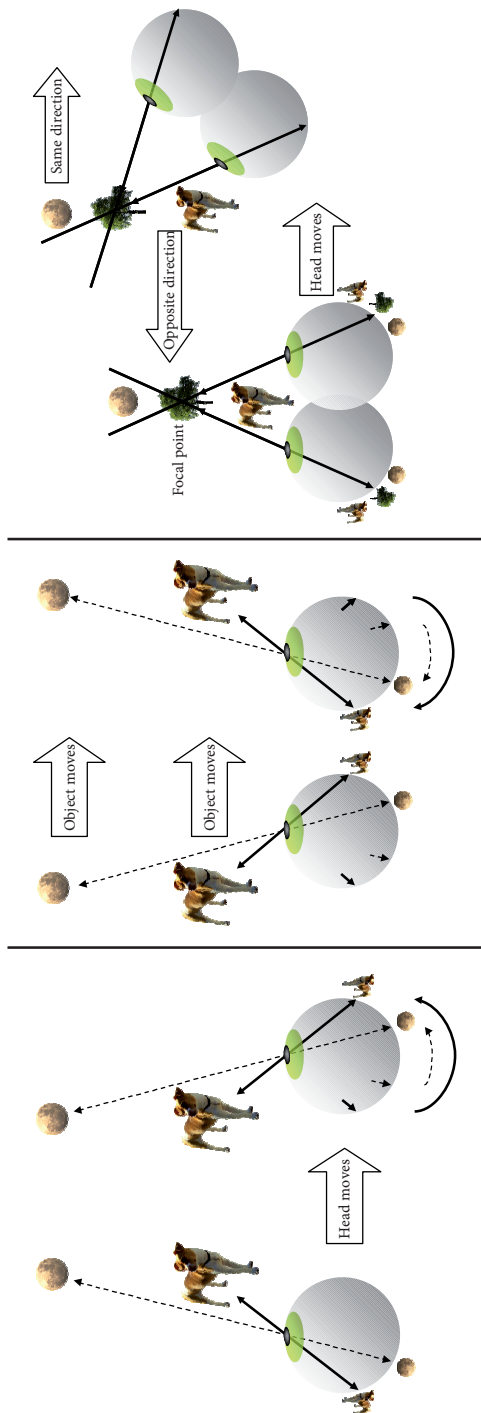


Figure 7. Seeing 3D through motion when the head moves (left panel) and when objects move (middle). The right panel illustrates the motion parallax.

Box 1. No one lives for ever

The first game in which all these optical illusions were simulated to their full extent is *No One Lives Forever 2* (Figure 8). The game featured a boss fight that took place in a trailer park while a tornado passed by. This action-packed level of the game showed off some of the best game physics of its time as the battle moved into a trailer which was lifted up into the air by the tornado. The player was thrown around in the trailer and only found out that she had taken off when the trailer started to fall apart, showing a swirling mass of other objects caught by the tornado!



Figure 8. *No One Lives Forever 2* exploits the simulation of 3D illusions through motion to the max.

direction of leaving the visual half-field is a cue that signals object motion and despite conceptually knowing that the moon does not fly with you, the simple everyday heuristics make us see it that way.

Another cue that signals depth is the direction of object motion that is related to optic flow. Expanding and contracting optic flow are used by the brain to calculate its position in space.

The left side of Figure 9 shows expanding optic flow. If you watch a big projection of a starfield simulation,² you actually fly into the stars and the objects move from the center to the borders of the visual field. These cues signal to the brain that you seem to move forward into a ‘tunnel’ and if both visual half-fields

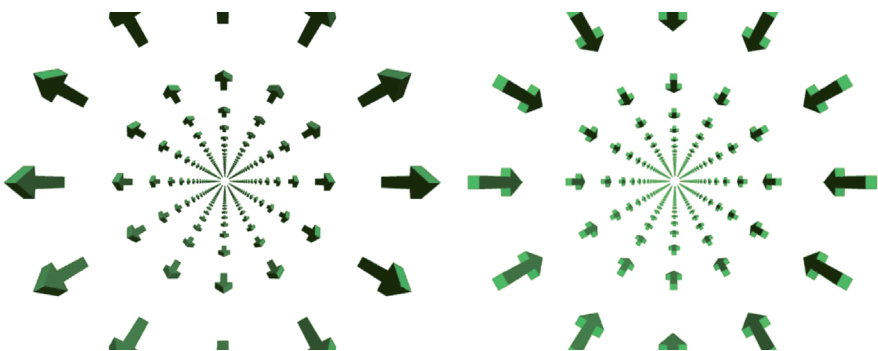


Figure 9. Expanding optic flow (left) and contracting optic flow (right).

2. <http://www.youtube.com/watch?v=uR42TTHKVwI>

are covered, for instance, in an IMAX half-dome theater, the observer cannot help but lean forward to compensate for the suggestion of inertia of body mass. The right side of Figure 9 shows contracting optic flow. This is when you play a starfield simulation in reverse. Now the objects seem to move from the borders of the visual field towards the center, which signals to the brain that you are flying backward. Projected onto a half-dome screen, you feel you move away from the center and cannot help but lean back to compensate for your own expected inertia, which is actually not there. Some people even tip over.

The illusion of depth is so strong that it urges our brain to resize objects so as to fit our conceptual interpretation of the environment. Figure 10 shows a railroad track and the Bouncer game character approaching.

Figure 10. Giant or gnome? Slanted lines indicate size through depth suggestion (a, b).



If you cut out Bouncer, shrink it, and place him at the horizon with the tracks between his legs, we see a gigantic monster coming at us, whereas if you put him at the bottom, standing between the tracks, our opponent seems to be a tiny gnome. But if we measure both character depictions with a ruler, their sizes appear to be the same in both situations; the only difference being the position of the character at the railroad tracks. With this in mind, let us now try to perceive that the character at the horizon is *not* a giant and at the bottom is *not* a dwarf. We fail. The slanted lines of the railroad tracks are interpreted as signaling a 3D scene, upper being farther away. The legs of the game character at the horizon span the width of the tracks in the upper part of the picture, whereas in the second situation, they do not span the width of the tracks in the lower part of the picture. Based on these cues, we erroneously enlarge the scale of the upper line between the feet in the first situation as compared to the scale of the line between the feet in the second situation. This is so to fit our concept that what is visible far away must be big!

It seems that we *have* to integrate separate elements into one scene and that we are biased to interpret them as being part of an interrelated whole. This pre-conception is exploited in modern as well as traditional multimedia theater.

Figure 11. Holographic projection of an actor (2007)(a) and Dircks' and Pepper's ghost (1863) (b).



Director Kevin Cunningham of 3-Legged Dog used high-definition video projections in his performance *Losing Something* (2007) to have real-life actors interact with life-size holographic representations of other actors situated at a different location (Figure 11, a). The tenets of this principle were already laid down by 19th century engineer Dircks and were improved by Pepper in 1863 (Figure 11, b). An actor below the stage is illuminated and this reflection can be seen on an angled sheet of glass positioned on stage. The audience interprets the scene as a ghost visiting the living characters.

4. Signal detection

The previous section demonstrated that we are constantly exposed to illusions and that our brains work with them for, among others, depth estimation. We also saw that the brain interprets incoming data such that they make a consistent whole with the concepts stored in the belief system even if we know that the integration cannot be correct (cf. the game character on the railroad tracks or creating holistic scenes between people and projections). Because dealing with illusions is so natural to us, visual artists and other creators do not find too many problems in deceiving the perceptual system with phantom actors, objects projected onto the environment, or seeing faces in a rock.

How illusions work and where people can go astray can be analyzed by adopting a signal detection point of view (e.g., Poor, 1994). How do we decide that a story is true or that people are yelling at you or not (Box 2)?

Signal detection comes into operation where there is uncertainty. In dealing with fiction, there is nothing but uncertainty. Yet, the observer tacitly relies on a critical notion of truth to say whether s/he heard or saw something. Three elements play a role in the decision making: Signal strength, individual sensitivity, and tolerance. Signal strength is a characteristic of the stimulus, where the features designed into or represented by an object provide cues that together indicate that what you see is not mist but a horse (the signal). In a signal detection approach,

Box 2. Police hallucinations

Des Moines police officers do not have to take magic mushrooms or other drugs any more to understand some of the suspects they have to deal with. They are now equipped with the Belgian-made virtual hallucination machine that simulates mental illnesses. Children become adults and people suddenly start yelling at you, whereas others act quite normally. The idea is that the officers can take care of such people with more empathy when they know what it is like to live in an illusion (Alex, Mar. 22, 2006).

the mist is regarded as background noise. As a further example, to decipher music from background noise, it should provide some organization that is different from random chaos or be louder than the background sounds. The more cues are provided or the more intense they are (cf. sound amplitude), the stronger the signal. Signal strength, however, depends on individual sensitivity whether the signal is perceived at all (cf. deaf people). Certain people detect cues that for others remain unnoticed, perhaps as a result of attention, interest, or physiological differences. Various animal species perceive different sounds and colors than we do. For people with low sensitivity to a signal, everything is background noise.

Once strength in combination with sensitivity allows signals to come in, individual criteria decide what this actually means, which is related to the kind of uncertainty one tolerates: In deciding whether the horse is real or a strange form in a cloud of mist, the observer has four possible solutions. S/he distinguishes an, in his or her view, typical horse feature (e.g., a snore) so that there is a hit (there is a signal correctly detected that indicates the living animal). Or, the observer does not see any horse-like features because the mist around the horse is too thick and so the signal is missed. There may be a false alarm (the real horse is in the dark such that the observer thinks it is only mist) and there may be a correct rejection (the mist does not show any signs of a horse, which is correctly identified by the observer).

After Shapiro and Lang (1991) and Shapiro and McDonald (1992), I want to introduce Bentall's (1990) version of signal-detection analysis. In the remainder of this chapter, I pursue this theory to show that illusory experiences are producing fiction and virtuality and that signal detection governs the way we deal with it.

4.1 Signal strength and individual sensitivity

Internal responses of hits, misses, false alarms, and correct rejections depend on signal strength, individual sensitivity, and tolerance. Let us substitute the horse in the example of the previous section with a fictional occurrence, a holographic projection, and let us substitute the mist by what the observer to his or her own standards would call 'reality.'

Before we can recognize a holographic projection of an actor as fiction, a minimum number of cues should be available in the stimulus. This is signal strength. They could be deviant colors, sizes, off-the-mark and slow interactions, or the presence of a projection screen. To be perceived, the signal should be stronger for an insensitive than for a sensitive person. If the projection is close to reality in all possible ways (from representation to affective behavior), only those who sense the tiniest difference perceive a signal that says "fiction."

When signal strength is high, people will perceive great distance between fiction and reality. They need not be very sensitive for detecting unrealistic features to make correct decisions (according to their own beliefs). With the current state-of-the-art, it is not hard to see that a holographic projection is not a real person on stage. However, deciphering fiction in a documentary or news flash demands more sensitivity. Given that cues to fiction are few in such genres, signal strength is low so that the individual sensitivity must be high to detect the signal at all.

The intensity of the stimulus determines whether we see large distances between signal and noise, between fiction and reality, respectively. If the signal is weak, an insensitive person does not see the difference and the fiction-reality confusion is likely to occur. A signal-sensitive person, however, may be capable of enlarging the distances between signal and noise, between fiction and reality, and so makes fiction stand out against its background. Such people have better stimulus discrimination and a 'nose' for detecting fiction. When a person detects cues to something being fictitious, criterion placement regulates how much they tolerate of it ("Yes, it's unrealistic but I suspend my disbelief for a while").

4.2 Tolerance and criterion placement

After cues are detected, deciding that something is actually fiction is related to so called 'criterion placement.' Two people evaluating the same situation may come out with different judgments on its reality status, depending on where they place their criterion in the overlap between signal and noise.

Suppose a horse walks out of the mist towards you and you have to decide as quickly as possible whether you see the horse or just mist. Certain people will be eager at calling for a horse while taking the risk for granted that they saw nothing but mist. Those people are happy to jump to conclusions based on a fragmented set of cues or 'facts.' They tolerate errors but do not want to run the risk of missing the horse so they call a horse whatever looks like one. When people are in an associative, unfocussed, and creative mindset, they quickly recognize animals in the clouds. Their decision making operates under 'fuzzy' circumstances.

People who are afraid of making such rash mistakes place the criterion differently. They do not care too much about missing a signal; they wait some longer until the horse is almost completely visible and then call it a horse. Such people are not over-enthusiastic but more reserved. They are thorough, not quick; they trade speed for accuracy. When people are in a rational, analytic mode of thinking, attention is focused on the discrimination of stimuli. Their decisions are 'crisp.'

4.3 The probability that fiction occurred

How can signal detection account for the fiction-reality confusion? In Figure 12, two normal distributions are depicted that represent the probabilities that an internal response occurs (hits, misses, etc.).

The signal is whether someone detects that there are fictional, false, unrealistic, or metaphoric elements in a given situation. The left curve pertains to decisions for noise or “Reality” and the right for signal or “Fiction.” When nothing is the matter and when there is no signal, merely noise occurs. Thus, the Reality curve depicts the internal responses to being exposed to noise. For Fiction, this is different. There is always reality involved in fiction, for instance, because the holographic actor represents a real person or because the story is based on facts – according to someone’s beliefs. The Fiction curve deals with ambiguous situations, raising uncertainty, so that there is noise coinciding with the signal. There is always some overlap between the curves because there may be a trade-off between, for example, a correct rejection of a lie or missing a signal and believing the phisher’s stories (see Chapter 3). Illusions transpire where the curves overlap. Creativity also takes place within this overlap (Hoorn, in prep.).

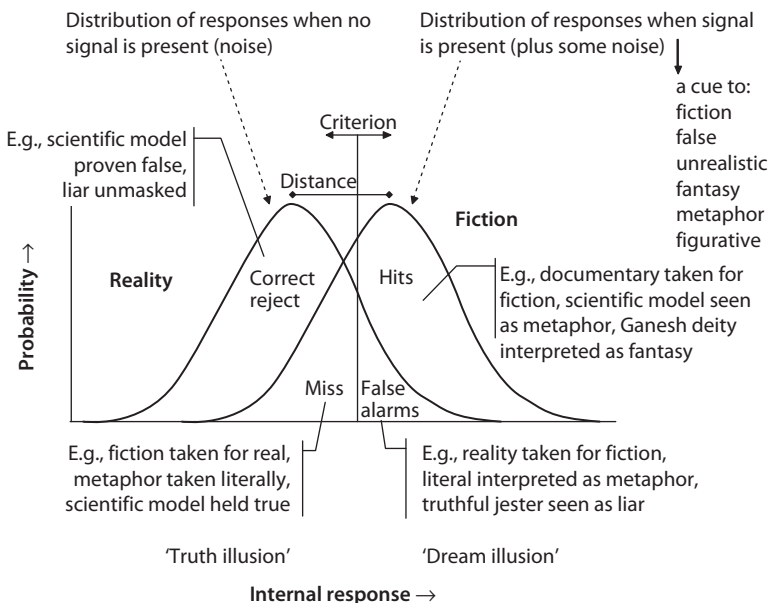


Figure 12. Signal detection analysis of the fiction-reality confusion.

Illusions are more likely to occur the larger the overlap is. When the distance between the two curves is reduced, the signal is harder to filter out. According to signal detection, people with higher signal-sensitivity perceive larger distances between the two normal distributions.

Whether someone is fiction or reality prone is not only determined by signal strength (the distance between the curves) relative to an individual's sensitivity but also by each individual's tolerance as expressed in the placement of the decision criterion (Figure 12). Therefore, illusions can also transpire when the criterion is placed at one of the extremes. If someone sees the magic of everything in the world (see next section), s/he places the criterion more to the left of Figure 12. S/he will hardly miss any occurrence of magic but also runs the risk of calling for many false positives (false alarms), the 'we live in a dream illusion.' If someone says 'no' to each signal s/he encounters, the criterion is placed to the far right. S/he will always correctly reject a lie but misses out on many metaphors and holds science for true all the way, the 'I hold the truth illusion.'

In deciding whether an actor is real or a holographic projection, Figure 12 shows that the observer has four possible solutions. S/he distinguishes an, in his or her view, unrealistic feature so that there is a hit (there is a signal correctly detected that indicates the fantasy). Or, the observer does not see any unrealistic features and so the signal is missed – by his or her own standards (the holography is taken for a real actor). There may be a false alarm (the real actor is illuminated such that the observer thinks it is the holograph) and there may be a correct rejection (the actor shows no signs of being a holograph, which is correctly identified by the observer, according to his or her beliefs).

In situations of survival, failure at diagnosing unrealistic elements in a representation may mean the difference between life and death. For the trout that is caught by the fly-like lure of the fisherman, missing that what she holds for a fly has fly-deviant features is lethal. In reverie, on the other hand, believers in crop circles would never want to miss signs of a divinity or of extraterrestrial life that plans on descending to earth. A false alarm, however, may result in being mocked and exposed as a fraud. People positively biased towards detecting fiction, magic, and the like may opt for erring on the side of discovery, saying "Yes, I see something unusual." Others may be more concerned about their reputations and are negatively biased to detect fiction. They may choose to be more conservative and decide for "No, I do not see something unusual – yet," running the risk of being eaten alive by the fisherman. Those people may feel that if there really is something unrealistic about that particular fly's composition, it will come to the fore at the next check-up. People more conservative in detecting fiction have higher chances of being fooled. Those who are more liberal in that respect have higher chances of being mocked.

Hits and correct rejections are in line with the observer's belief system, whereas false alarms and misses are at odds with it. The analytical mode of thinking drives at identifying hits and correct rejections. It is conservative in accepting novel information and only allows incremental changes to its beliefs. The creative mode of thinking works in the area of false alarms and misses, is eager to jump to conclusions, and welcomes disruptive changes. And although according to his or her own standards, the observer is simply mistaken where it concerns signal misses or false alarms, s/he is under the impression that what s/he saw was right ("insight") and in line with his or her beliefs, although perhaps it was not. For a shorter or longer moment, that person lived in an illusion (Hoorn, in prep.).

4.4 People living in an illusion (or not?)

Certain people are more inclined to magical thinking than others. For instance, in Hyderabad, India, two worshippers of a holy man took a sickle to cut off his leg below the knee because they believed that the leg cured diseases and granted wishes. Then they left the holy man to die (Farooq, Dec. 13, 2007). In 2008, Tanzanian albinos were regarded as living ghosts, hunted down, and chopped to pieces. Their frail white body parts would make powerful potions for doing black magic (Australian Broadcasting Company, Dec. 1, 2008). In the UK, the temple of the church of Jedi located in Surrey practices the Jedi Faith as introduced by the science-fiction space opera *Star Wars* (Lucas, 1977–2005).³ Dressed in Jedi robes, a growing number of believers is taught how to handle lightsabers and is initiated into the theory of 'the Force.'

Magic and sorcery are used to explain, influence, and manipulate things we find hard to handle or hard to understand. *Oracle magic* is to know more about past, present, and future, and for non-believers an example of unwarranted truth telling. *Transforming magic* is directed at the natural world, the human condition, or power relationships, and typically includes a metamorphosis: a pact or family bond with an animal (cf. totem poles), connecting to an alter ego in a parallel universe (cf. séances), or eating body parts and excrements of victims or potent others to inherit desired qualities (Marshall, 1995, p. 99).

Between 1989 and 2001, the wars in Liberia and Sierra Leone were heavily influenced by magic. Mama Munda was an occult priestess who in cooperation with the devil Kasella created an army of invincible warriors, virgin young men, invulnerable to knife cuts, bullets, or rocket missiles. These men went through an initiation rite to become Kamajor (hunter warriors). The initiation was to murder

3. Retrieved Aug. 26, 2009 from <http://www.jedichurch.org/>

an enemy (civilians included), burn them, and mix the ashes with magic herbs after which the mix was brought under the warrior's skin with a knife. In doing so, the ashes inside the scars would blend in the magic dominance over the enemy with the warrior's supernatural powers (Maris & Xanthopoulos, Oct. 2010).

Sorcerers also try to become unified with the natural elements, which transform constantly. The wind blazes the fire, warmth stimulates growth, vegetation rots to humus, and water becomes clouds. All these things combine with each other in various ways; they can be benign or harmful, and each is personified by different creatures (an animal, a troll) that can form an alliance with a human medium and influence the course of events (Marshall, 1995, p. 107).

Both transformational and oracle magic heavily rely on close distances between the Fiction and Reality curves and the wish to sense all potential magical occurrences. The truly magical moment is when a hidden deity or animal demon copulates with a mortal being from which a half god or half demon is born (cf. Walpurgis or the birth of Dionysus from the thigh of Zeus). Another form is divine incarnation (see Box 3). This mortal-to-divine union is a universal parable for the fluid boundaries between the visible (Reality) and invisible world (Fiction) (Marshall, 1995, p. 111).

In all these examples, people attempt to draw as much of the background noise into the music, trying to see as much fiction in reality as possible. They increase the likelihood that hits occurred by fusing fiction with reality, creating a large overlap between the normal distributions (Figure 12), minimizing the distance between signal and background. In addition, they attempt to decrease the chance to miss a magical occurrence (criterion placed left in Figure 12) but at the

Box 3. Divine incarnation

In India, malformations at birth often are interpreted as divine incarnations. Chapter 1 showed two-faced baby Lali as the incarnation of Durga, the Hindu goddess of valor. Two-year-old Lakshmi is the result of an incomplete *Heteropagus twins* (Siamese twins) or "parasitic twin" syndrome, a merger between twin bodies in the mother's womb (Figure 13). The eight-limbed baby was born on the day devoted to the celebration of the four-armed Hindu deity Vishnu, the preserver and protector of creation. Vishnu's consort is Lakshmi, the four-armed goddess of wealth, after whom the girl was named. Her mother Poonam Devi considered her girl "... a miracle. A special blessing from God" (MailOnline, Nov. 9, 2007).

Figure 13. X-ray of the eight limbs (a), the 2-year old girl (b), and the four-armed Vishnu (c).



Box 4. Being absorbed by virtual worlds

In the Belgian film *Thomas est Amoureux* (Thomas is in Love) by Blasband & Renders (2000), the protagonist lives through his computer screen and does not leave his house for eight years, maintaining nothing but virtual relationships and falling in love with a girl in cyberspace.

In the documentary *Beyond the Game* (De Putter, 2009), we follow two young gaming champions who devoted their lives completely to battling orcs, gnomes, dwarfs, elves, trolls, taurens, and undeads in World of Warcraft. During a tournament, they are stared at by hundreds of admirers.

cost of being mistaken oftentimes. They settle on a criterion of acceptance that minimizes the chances of not seeing magic when there actually was (according to their beliefs), not caring too much about perceiving magic when, according to their own beliefs, there is none.

Certain viewers of film, readers of books, or video gamers also are more willing to suspend their disbelief than others. Green, Garst, and Brock (2004, p. 169) discussed that people who were more absorbed by or “transported” into the narrative (Box 4) became less critical of flaws and ‘untruths.’ In signal detection terms, criterion placement shifted towards the noise.

4.5 Signal detection from a personal experience

In April 2008, I went to the NAB show on media technology in Las Vegas together with my Chief Technical Officer Marco Otte. We could get a discount on Paramount’s *Star Trek, the Experience* hosted by Cedar Falls in the Las Vegas Hilton. There were two rides on show, the Borg Invasion and the Klingon Encounter. The story of the Borg Invasion went that you as voluntary subjects in a Federation experiment were snatched by the Borg to be ‘assimilated,’ that is, to become a human robot like the Borg.

We had to put on 3D goggles (‘safety glasses’) and were exposed to a 3D movie in which small dragonfly robots (‘drones’) swarmed at you extremely fast as if they came out of the screen. Then they would spray ‘nanites’ at you, which ignited the assimilation. In particular the fast moving objects that were directed at the face inevitably activated automatic reflexes of fear for collision and evading impact. Although from a conceptual level of knowing to be in the fiction (3D goggles, movie theater, unrealistic story), the motion reflexes of the biological system, the startle, and the arousal were real.

In that split second, the data-driven sensory input indicated high perceived realism – many strong realistic features (i.e. the way the objects flew at you)

overriding the concept-driven process. From a signal detection point of view, the biological startle response was the noise that overpowered signal strength, so that stimulus discrimination failed, the distance between the Reality and the Fiction curves became smaller, and for a moment, the signal (3D goggles, movie theater, unrealistic story) clipped. This personal experience is in line with the work of Konijn, Walma van der Molen, and Van Nes (2009), who demonstrated that when the emotion that media provoke is real, people tend to think that the depicted scene is too ("the scene must be real because my feelings are real").

The same happened during the Klingon Encounter, the second ride, where our space craft went into a dog fight with enemy Klingon war vessels. We sat in a flight simulator that was placed inside a huge projection half-dome. Through the windows we could see the bumpy ride we made through outer space, while the visuals were supported by motion effects (up, down, left, right, dive, tilt). Here the motion perception system was fooled by the technology because the body – needlessly – adapted to the projected motion parallax and optic flow (cf. Section 3). The full coverage of the visual half-fields induced hypercorrection of the expected imbalance. Again, the conceptual knowledge that we were in a flight simulator looking at a projection screen was momentarily overridden by the motion data injected into the sensory system. For a short moment, the signal that we were immersed in a virtual world was missed so that our bodies responded to the illusion as if it were a real situation.

It seems, then, that feeling immersed, 'absorption,' 'transportation' (Green & Brock, 2000), or the sense of 'being there' is best achieved at the biosensory level. Better safe than sorry seems to be the way our survival system is programmed (cf. Shapiro & McDonald, 1992) so that we duck when shot at, even if we know the ride is unreal. It seems to me as if a sense of 'being there' (absorption, transportation) is established much easier with effects on the level of biological signal processing than on a higher cognitive level. This happens frequently in (violent) video games, which are fast and aimed at survival instincts and reflexes (vigilance, arousal), evoking strong transportation and immersion effects. With Green and Brock (2005, p. 126), we could state that "... whereas the process of transportation is akin to experiential immersion and absorption, it is quite different from critical thinking and from cognitive elaboration."

Still thinking that 'being there' and taking fiction for real could only be momentary and happening at the reflexive biological level, I was astounded by a group of visitors who inspected the museum exhibition on Klingon history. These people were true Trekkies as they discussed all the details of the Klingon tribe as if they were archeologists debating the culture of the Celts. These Trekkies probably knew more about Klingon society than they did about the European Iron Age. Were they deliberately playing (large distance between the curves) or not (missed

signal)? For me, there was no telling whether they believed Klingons to be real or not (my signal detection was confused). I later found out that there is even a Klingon Language Institute where you can learn this language invented by Marc Okrand and study the Klingon culture.⁴

5. Signal detection in the fiction-reality framework

The base of the fiction-reality framework as explained in Chapter 1 is a continuum of truth values, ranging from ‘true’ to ‘probable’ to ‘false,’ according to someone’s beliefs. Signal detection theory describes decision making under conditions of uncertainty, implicitly relying on a notion of truth on the side of the decision maker, ‘true’ being a hit and ‘false’ being a correct reject, whereas misses and false positives would be ‘probable.’ In detecting fiction, however, careless use of the terms ‘true’ and ‘false’ could lead to confusion.

At detection level, distinguishing a holograph as fiction would be a hit, and thus ‘true.’ In terms of the belief system, however, ‘Fiction’ is not true but everything ranging from ‘probable’ to ‘false.’ Reversely, detecting something as ‘Reality’ would be a correct rejection (of ‘Fiction’ that is) and therefore a ‘false’ (no signal, merely noise). In the belief system, however, ‘Reality’ would not be false but everything in between ‘probable’ and ‘true.’

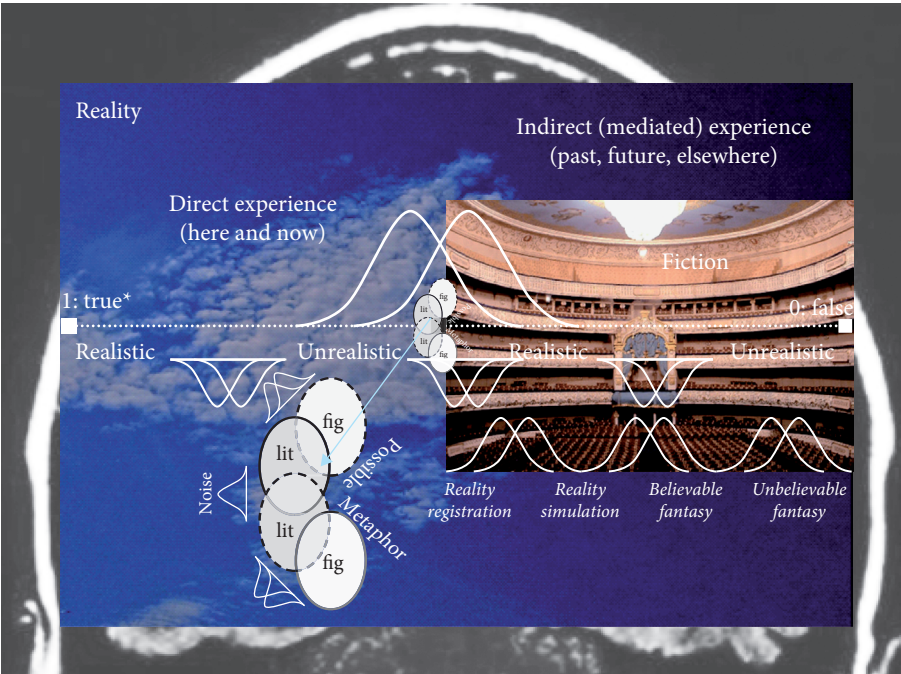
Therefore, we should distinguish uncertain observations from responses to those uncertainties. If the uncertain observation is “Do I detect something that is fiction?”, the question should be translated into “Do I see something that is false-reality?” The response to that in the case of a hit (e.g., a holograph) is “Yes, I detect something that is false,” which translates back into the confirmation that fiction resides between probable and false in the belief system of the observer. In the case of a correct reject (e.g., the actor as a person), the response is “No, I detect something that is not false (and thus is true reality),” which translates back into the confirmation that reality resides between probable and true in the belief system of that person. This kind of reverse-coding between detection level and belief system is only necessary if the signal is related to detecting fiction, lies, impersonations, unrealistic depictions, and other counter-indications of ‘Reality’ (cf. Box 5). If detection takes place between two real things (e.g., “Is it a horse that emerges from the mist?”), the truth values at detection level coincide with the attribution of truth in the fiction-reality framework.

4. <http://www.kli.org/kli/>

Box 5. Survey design and chicken soothsaying

Funny as may be but the same logical considerations are found in structured questionnaire design as in soothsaying with chickens. Surveys often frame a question or a statement in two ways: “Was it Okay?” versus “Was it so-so?” The idea is that if you as a respondent say “Yes” to the first, you should say “No” to the second. Researchers can control for response inconsistency that way. In the analysis, the researcher translates the negatively phrased items into positive phrases so that the “No-s” are reverse-coded into “Yes-es,” which makes the results comparable.

The Azande people of southern Sudan used to consult oracles by means of chickens. Poison was pushed into the beak of the chicken and a question was posed to the bird in such a way that the death of the animal would mean a positive or a negative answer. The Azande were smart, however, and controlled for response bias by doing a decisive test with a second chicken. If in the first run the bird’s death to a positively phrased question would indicate negation, the question to the second chicken was put negatively so that the chicken should stay alive to confirm the consistency of the oracle’s answers (Marshall, 1995, p. 113). See also <http://www.friendsrevolution.com/2010/10/azande-poison-oracle-testing-witches.html>).



* Note: According to belief.

Figure 14. Blurry borders in the fiction-reality framework: Probability-of-occurrence curves overlap.

Box 6. Natural 4D

The other day, I watched Jurassic Park 1 (Spielberg, 1993, Universal) at home on my video projector. I was alone, it was dark, and I used the largest projection size (3 by 2m) at a distance of about 3 meter. That in itself made a pretty impressive picture but the atmosphere became more dense when outside my house a rainstorm began, thunder and lightening struck, the moment the big T-rex broke loose and threatened the children in the jeep. Imagine this while watching those dinosaurs in 3D! To integrate fiction with reality, movies should be watched in 3D outside in an environment and with weather conditions that match the contents. Natural 4D: Rainboots on!

Keeping the reverse-coding in mind, a signal-detection viewpoint clarifies the mix up between Fiction and Reality (Figure 14), which is a decision at the highest level based on many smaller decisions that are related to many types of signals (e.g., falsities, unrealistic features, metaphors). The confusion easily happens because in Fiction, realistic features and literal statements occur as well. In Reality, perceptions of features as unrealistic or the occurrence of unlikely events and coincidences are not absent (Box 6). Illusions transpire because criterion placement (what do I allow) at the extremes of the probability-of-occurrence curves or low individual sensitivity for fiction cues (I didn't even see there were any cues so no criterion to place) may lead to erroneous rejection of what was meant as a joke. With a high sensitivity for detecting fiction [that everything is nonsense (sensitivity) and I won't have it (decision criterion)], the illusion may transpire that, for example, all the fuzz about drunk driving is greatly exaggerated.

Thus, at many places in the fiction-reality framework, signal detection occurs and decides between, for example, Reality registration and Reality simulation (Chapter 2), between Believable and Unbelievable fantasy, between realistic and unrealistic representations, between metaphoric and literal communication, and between literal and figurative features. In novel metaphors, for instance (Figure 14), the curves do *not* overlap between the two intersecting sets of literal features; according to belief, these literal features describe reality as is; they are background information or 'noise.' By contrast, the literal features of the one concept that are connected to figurative features of the other concept do show overlapping curves of Fiction and Reality. They are connected to signal cues, which provide information that is salient or foregrounded (cf. Šklovsky, 1965).

5.1 Signal detection with metamorphosis and impersonation

The previous chapter argued that metamorphosis came in two main variants: True versus false metamorphosis, while impersonation would be an instantiation

of the latter. The strange thing about metamorphoses of any kind is that often the transformations that occur between an entity in a past, current, and future state remain undetected. In other words, there seem to be two out-of-category entities and the newer entity (e.g., the butterfly) stands out against its former shape (i.e. the pupa, caterpillar, or egg). If the distance between the normal distributions is very large, the category boundaries seem crisp. The suspicion of an illusion transpires when conceptual knowledge is introduced, for example, through teaching. Now someone has to believe there are connections between the two stages, which increases the size of the overlap, increases uncertainty, and makes the two seemingly out-of-category entities acquainted and more similar. Anyone with good stimulus discrimination has great difficulty in recognizing butterfly features in the caterpillar: They are different but the conceptually updated belief system tells the observer to blur category boundaries and enter the realm where illusions occur easily.

That is the realm the imposter type of impersonator likes best and hence s/he offers the smallest possible number of cues to signal that fiction is involved. The imposter capitalizes on creating the perfect illusion and wants every feature to dissolve in the background noise, suggesting perfect overlap between the normal distributions, as if every feature is a literal description of reality. The imposter attempts to make signal detection impossible. It is the same trick as wearing camouflage. The acting performer who assumes another person's character does not do that. S/he provides cues to the observer to detect the fiction, for example, by making her transformation visible (cf. the Russian Formalist "distancing effect" viz. Šklovsky, 1965).

The likelihood that illusions happen and thus that a moment of fiction occurs actually coincides with the creation of connections or recognition of similarity between the foregrounded, salient entity or 'signal,' where the focus of attention lies, and some features of some entities in the background noise, which become more salient due to the perceived connection. This is particularly disturbing, disrupting, or derailing, when the belief system suggests that these are entities lying outside of each others' category. For certain people, this is more difficult than for others: The similarity seekers I will call creators or integrators, the dissimilarity finders I will call analytics or separators (see next).

6. Integrators and separators

In this section, I want to argue that minds in a certain mode or orientation have a different sensitivity and tolerance for fiction. By that I mean that someone in a deductive mode (e.g., a chemical analyst) is focused on making the distance

between normal distributions wider (sensitivity) and places the criterion (tolerance) to the right (Figure 12). Someone in a creative and more synthesizing mode (e.g., a poet) tends to make the distances smaller and places the criterion to the left. Of course, in being an artist as well as a scientist certain people can do both (e.g., Pfenniger & Shubik, 2001a, pp. 258–259). Yet, I do not think that someone can do these things all at the same time because “it is to the organism’s advantage not to differentiate one stimulus from others when that differentiation is irrelevant to the purposes at hand” (Rosch 1999/1978, p. 190). I will argue that the purpose of the synthesizing, artistic and holistic mind is to find meaningful connections irrespective of ‘truth,’ whereas deductive, analytic, and logical minds want to find connections that are ‘true’ irrespective of their (semantic or emotional) meaning.

Carveth (1984) was the first to make a distinction between “linkers” and “separators.” Certain people, Carveth argued, bias towards perceiving similarity, whereas others bias towards dissimilarity. The first want to merge and the second want to differentiate phenomena. Carveth attributed these tendencies to gender. However, I prefer to reserve this distinction for those attracted by the humanities and those attracted by the natural sciences while admitting that some people can do both, although not in equal amounts and that the distinction is not always razor sharp. The artists, priests, and scholars are the similarity-prone ‘linkers’ and the engineers, logicians, and analysts, the dissimilarity-prone separators. In addition, I would not want to speak of ‘linkers’ so much because it is not just putting two things or concepts together but merging, synthesizing, or transforming them. Therefore, I would prefer to call the synthesizing minds ‘integrators.’

I am fully aware that neither of the predicates such as artistic, creative, synthesizing, integrative, holistic, associative, hermeneutic, nor scientific, analytic, diagnostic, deductive, logic can be easily defined in a strict or even accurate manner. This is partly because their meanings differ across disciplines; sometimes overlap, but also because their pragmatic efficacy depends on a certain plasticity and leniency. Therefore, I want to catch the meanings that these predicates together hinge at under the terms of *integrators* versus *separators*, knowing that certain people can be both but never at the same time or in equal amounts.

6.1 Constructing similarity between foreground and background

Arts and sciences are both creative in establishing out-of-category connections, except that minds in an artistic mode have a different sensitivity and tolerance, seeing more overlap between normal distributions while placing the criterion for having found a connection differently from minds in an analytic mode. Stent

(2001, pp. 36–37) envisions a sliding scale between arts and sciences in that they are both creative and offer new insights about the world. Both are focused on making connections between otherwise distant domains. “... in both art and science, discovery and creation actually refer to the same process” (ibid., p. 41).

Suppose someone wants to fuse a horse with a bike. A sculptor would be satisfied with making the bike look like a horse (cf. Hoorn, 2002) or the poet would write down a metaphor such as ‘a horse is a living bike’ or ‘a bike is an iron horse’ (cf. the ‘conceits’ of the Metaphysical Poets). A scientist or even better an engineer would want to have a living horse equipped with iron bike extensions (i.e. a cyborg horse) or a bike equipped with living horse utensils (cf. organic computer chips). Putting it impolitely, an artist would be satisfied with creating a mock-up of a bikehorse or horsebike to contemplate its cultural meaning, whereas the scientist/engineer would probe for a prototype to see whether it works. That, of course, provides the artist with much more freedom in establishing connections between remote domains because those connections only have to stick together in the mind and not necessarily in the physical world. In imagination, things do not fall apart easily.

In view of a signal detection explanation, the integrative mind has poorer stimulus discrimination. It has a lower sensitivity to distinguish a horse from the background noise, in which also bikes and train locomotives are present (cf. Hoorn, in prep.). The mind in an artistic, integrative mode distinguishes a horse but also perceives a number out-of-category connections to a locomotive or a bike, in the latter case, both having a saddle and a tail. In doing so, the overlap between signal (‘horse’) and noise (e.g., bikes) grows and more connections lie in the ambiguous sections of missed signals and false alarms. This is why a mind in an associative, artistic mode can see horses in bikes or animals in the clouds.

A mind in a more diagnostic or analytic mode has a higher sensitivity to pick up the signal (‘horse’) and separate it from the background (e.g., bikes). The analytic mind has better stimulus discrimination and sees the world less ‘blurry.’ Because of that, it also is less likely to make connections that the artistic mind does make.

With regard to tolerance, an artistic mind not only *sees* or *constructs* connections between horses and bikes; it is also more flexible in *accepting* them than the analytic is. Figure 15 shows that the analytic mind places the criterion of accepting the signal (here, a horse with an out-of-category connection to a bike) to the right. That is, the analyst mistrusts the signal, does controls to avoid false positives but runs the risk of missing a host of potential connections.

Once the mind in an analytic mode assumes a connection (the hypothesis), it focuses on things being different, tends to see dissimilarity, to call the hypothesis of connectivity fictitious, because it strives for falsification. Hence, the approach

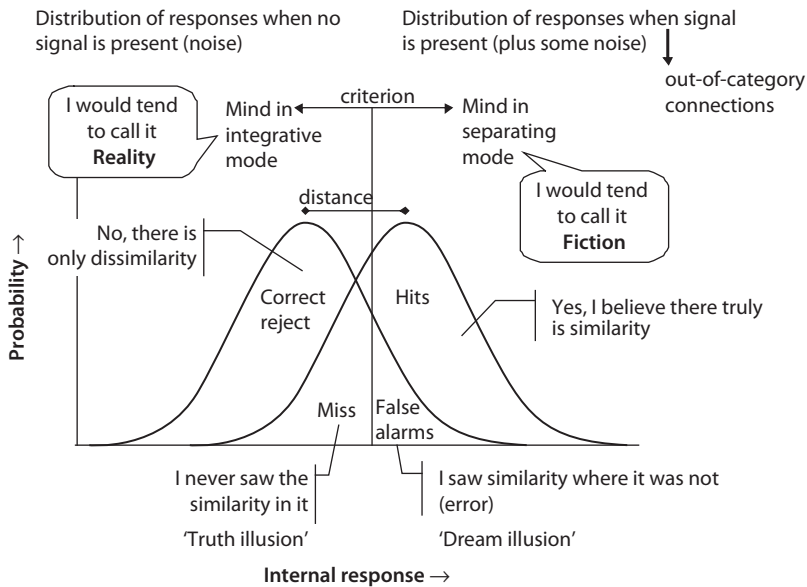


Figure 15. Integrative versus separating mind-sets.

of the analytic mind to the data is deductive, oriented at the singling out of separate factors or entities, and showing they are divergent.

A mind in an artistic mode places the criterion for accepting the signal (here, the horse with an out-of-category connection to bikes) to the left (Figure 15). It accepts things as signals that the analytic mind would consider noise (such as the loose similarity between bike and horse saddles and between bike and horse tails). For an artistic mind, the (perceived) probability of having found a connection is higher, the (statistical) area of rejection is smaller. The mind in an artistic mode is looking for confirmation of sameness. It is but loosely attached to truth-finding and tends to see more overlap between fiction and reality as long as it has meaning (in a semantic, symbolic, or emotional sense). The point is illustrated by Jakobson (1981), advocating that any formal equivalence in a poem (e.g., rhyme) indicates a semantic connection (i.e. rhyming words have a stronger meaning relationship than non-rhymes).

Briefly, equivalence in sound, projected into the sequence as its constitutive principle, inevitably involves semantic equivalence, and on any linguistic level any constituent of such a sequence prompts one of the two correlative experiences which Hopkins neatly defines as “comparison for likeness’ sake” and “comparison for unlikeness’ sake.” (Jakobson, 1981, p. 40; Hopkins, 1966/1865, p. 106)

In an artistic mode, the mind trusts the signal more than in an analytic mode. The only thing an artist fears is to have missed something, not seeing, highlighting, or making a connection where there was a possibility to do so. The mind in an artistic mode does not fear making errors in the sense of false alarms. Erroneous connections are fine as long as they can be made meaningful. Moreover, such mistakes open options for more new (meaning) connections. For the artistic mind, the area of correct rejections is small. Things do not differ very quickly. A mind in an artistic mode approaches the data through synthesis.

I assume, then, that technicians, logicians, and scientists (if they are without an artistic gift) have minds that prefer to work with logics, structures, formal representations, numbers, procedures, and data (cf. Hoorn, 2001). Scientists have the inclination to systematize a complex situation and solve their problems in a structured manner by decomposing it into smaller units. Artists, priests, and scholars (provided they have little analytic talent) are not like that. They tend to solve their problems in an associative and synthesizing manner rather than through formal analysis (*ibid.*). Artists do not decompose: They compose.

Being an integrator or separator may come in various degrees and certain people can do both. Nevertheless, when someone is in an integrative mode he or she cannot be in a separating mode because then the two normal distributions should be at two distances simultaneously and the criterion should be placed at two different locations at the same time. The challenge an artist faces, for instance, is to create metaphors, to craft a convincing story, which does not need to be real. Artists do not achieve this through formal reasoning but through intuition and association. An artist looks at what is the same between two entities that cannot be connected in the physical world, so that a bike becomes a horse and a hand becomes a turkey (Figure 16).



Figure 16. Body painting by Guido Daniele.

For the ‘separator’ to call two concepts “the same,” a high mean perceived similarity and low dissimilarity is required between the foregrounded signal and the background noise. Only then the separator can decide that the connection is apparent. The associative, holistic mind has poorer stimulus discrimination and can decide for similarity on the basis of a thin connection, even when dissimilarity is high. For the integrator (similarity prone), the signal-to-noise ratio may be approaching 1 (1 : 1) whereas for the analytic separator (dissimilarity prone), signal-to-noise ratio should be (much) greater than 1. Probably, the integrator can

be convinced more easily than an analytic separator that Zou Ren Ti, the robot, is truly the twin brother of Zou Ren Ti, the inventor (Chapter 3, Figure 16).

7. Believers versus self-skeptics

As with integrators and separators, the categories of believers versus self-skeptics that I am about to develop are not completely exclusive because sometimes people change with situations. Just because one is a religious fundamentalist does not mean that one maintains the same ontological assumptions about all areas of life. Artists can behave like scientists at times, so that their sensitivity or tolerance is not somehow mysteriously a property of the person but of the mind set at a certain time. The same holds for firm believers who sometimes doubt their own convictions or self-skeptics who can be really sure about certain matters.

The highest chance for confusion between fiction and reality is when the distance between the two curves is small (Figure 12). The area of making wrong decisions (misses and false alarms) grows and for many people such uncertainty is hard to live with. They have made their lives more comfortable by becoming a believer, someone who ardently adheres to a fixed worldview and unchanging beliefs, whether secular or religious. Strong believers divide the world in right and wrong, in which moral judgment coincides with truth value (Chapter 1). Because it is clear which set of beliefs is right, all else must be wrong. In other words, the distances between the fiction curve and the reality curve are conceptually made larger so that classification of incoming data becomes easier. Such people are sensitive to 'pure' signals, because if something uncertain is not a hit, it must be correct to reject it, while misses and false alarms can hardly occur. Because the distance between curves is so wide up front, believers do not need to work hard to place the decision criterion differently on each occasion a possible cue to fiction occurs. The world is divided black and white and these people avoid the gray zone. This saves on elaboration and reflection, and therefore, true believers save on cognitive load (also see Box 7).

Skeptics to their own beliefs have more work to do. They permanently deal with uncertainty. For them, the two probability curves always overlap ('the gray zone') and time and again they need to verify empirically whether the belief system still holds or needs to be adapted. Such people are less discriminative and perceive more noisy signals. They seek for possibilities that there is truth in art and fraud in science, something sensible in a metaphor and something nonsensical to a natural law. Skeptics to their own beliefs are deviation tolerant. That is, they tend to place the decision criterion to the left (Figure 12), which means that more of the noise is allowed to the signal so to catch those things that according

Box 7. Proof or spoof?

For the fool and the genius alike, everybody else is wrong. In Chapter 1 (Section 1.15, Figure 4), we saw the example of the self-acclaimed genius who was despised by his fellow villagers for singing dreadfully. However, we also have the examples of Van Gogh and Galileo (convicted 1633), who were ridiculed in their own time and now considered heroes. In October 1992, 359 years after date, the Vatican Science Panel of Pope John Paul II made its apologies and cleared Galileo's name from blasphemy. Or as Elliot Carver in *Tomorrow Never Dies* put it: "The distance between insanity and genius is measured only by success" (Spottiswoode, 1997).¹

¹ <http://www.imdb.com/title/tt0120347/quotes>

to belief fall outside their ontology. However, that puts the burden on them that they either make too many errors or that they yet missed another (weak) signal. Therefore, they want to double check before they call something a hit or think it is the everyday noise of reality.

Whether someone is self-skeptic or a believer is visible in the strength of the beliefs, which is the concept-driven aspect of the decision for fiction. For a believer, category boundaries are clear and relatively fixed: Entities are in or out. A self-skeptic lives in a world of probabilities rather than truths and has weaker beliefs. For a self-skeptic, the two probability curves overlap more than for the believer. Therefore, they differ in their use of the truth continuum (Figure 14): The self-skeptic uses mid-scale values, whereas the believer opts for the extremes. For a self-skeptic, categories are permeable, dynamic, and changing over time. Features of an entity (e.g., paws) may participate in one set (e.g., birds) and simultaneously in another (e.g., reptiles). For a self-skeptic, features have so called partial membership functions. For the believer, feature sets are precise and fixed.

Being skeptical of your own convictions or being a believer may coincide with being an integrator or a separator (Section 6) but not necessarily. Being a believer or a self-skeptic is stronger than being an integrator or a separator. The beliefs are on a 'deep' conceptual level and form the basis of perception and behavior. Seeing similarity between two out-of-category entities is more data-driven and 'superficial.' An integrator sees similarity between two out-of-category entities and perhaps is more inclined to adapt the belief system than a separator would. Yet, an integrator may recognize the similarity ('A dragonfly is like a helicopter') but still not think these are members of the same category. As a child, we start with a rather fixed world view, brought to us through upbringing and education (see Chapter 1). Thus, everybody is a believer in principle. However, people who tend to be integrators have higher chances to become self-skeptics than separators do. Table 1 puts it schematically.

Table 1. Deviation tolerance and concern for misses or mistakes.

	Criterion placement		Misses	False alarms
	Towards noise (left)	Towards signal (right)		
Integrators	Tolerant		Concerned	Unconcerned
Separators		Intolerant	Unconcerned	Concerned
Believers		Intolerant	Unconcerned	Unconcerned
Self-skeptics	Tolerant		Concerned	Concerned

Self-skeptics are tolerant and concerned (Table 1). Ardent believers are intolerant and unconcerned. Integrators such as artists are tolerant and concerned about missing something but not about speaking out of turn – they are similarity eager. Separators like pure analysts are intolerant to ontological deviation, unconcerned about missing connections with the background but very concerned about making rash claims and jumping to conclusions – they are dissimilarity prone. In other words, a scientist only resembles an artist if s/he is also self-skeptical. If not, the person is a pure analyst, which comes close to being an orthodox believer.

Tolerance to deviations from ontological classifications is something for integrators and self-skeptics rather than separators and believers. Separators and believers are more likely to adhere to fixed concepts, meaning that they approach the world with precise boundary classifications and merely check whether new input is in or out of category. Different from believers, separators do make an effort (logically or through formal experimentation) not to make hasty conclusions: They do not want to confirm class inclusion whereas in fact – according to their own beliefs – there is none. Integrators and self-skeptics do not easily reject something that mismatches their beliefs and are inclined to suspend disbelief (Chapter 1, Section 1.7). Self-skeptics, moreover, check out empirically (which may be exploratory or experimentally) whether new observations perhaps have some ground in the physical world or not. This is epistemic appraisal, which is more elaborate and effortful cognitively than simply checking category membership like believers do. Things perhaps are at odds with what we know but they may look somewhat realistic (a form feature) or may provide some extra information beyond the literal description (figurative meaning).

Allowing fuzziness of ontological classes gives room for adaptation. When people are tolerant to deviations of the known concepts, they minimize the distances between the probability curves and decide in such a way that they miss little but at the risk of hasty decision making and jumping to conclusions (cf. the high-risk aspiring entrepreneur). The fuzziness that emerges as a result of allowing more background noise to the signal gives way to adaptation to a changing environment and provides space for experimentation with novel ideas.

CHAPTER 5

Beyond realism

Virtual people

“For we shall be cyborgs not in the merely superficial sense of combining flesh and wires but in the more profound sense of being human-technology symbionts.”
(Clark, 2003, p. 3)

Previously, I argued that the decision for fiction and reality was based on individual sensitivity and tolerance as related to signal strength. However, such decisions for ‘real’ or ‘unreal’ are the end phase of a larger process of epistemic appraisal. In addition, we also identified in earlier chapters a contamination between the attribution of truth and ethical considerations. This chapter argues that truth attribution and perception of realism have an affective component. The best way to illustrate this is to look at how we respond to virtual people. Not only do we have to deal with those who pretend being someone else (cf. the phisher), we also respond emotionally to fictional characters, whether we can interact with them (e.g., game characters, embodied agents, avatars, robots) or not (e.g., in novels, movies, soap series, reality shows, or theater play). In many of these cases, epistemic appraisals are affected by emotionally-laden factors. This chapter will also look at characters with a symbolic or figurative side and at humanoid robots that are meant to replace real people at certain tasks. Moreover, we will touch upon the possibilities of interacting with virtual people by connecting the computer directly to our brains (cf. cyborgs) and how that may relate to moral reasoning.

1. Virtual people in real life

Most messages we receive are sent by humans. We reply to e-mails, write text messages on our cell phones, and receive invitations to a money transfer that start with “Beloved friend, I know you are a trusted person of high reputation.” Whether we deem these messages true or not is not only a matter of realistic representation; it is also about the sender’s moral reputation. Interestingly, the mere observation that the sender is not ‘true’ in the double sense of the word does not withhold us

from being emotionally affected. We get angry, feel disturbed, and want (someone) to take action to remove them from the Internet. These experiences weigh in the next time we judge an ambiguous message as truthful or not.

2. Fictional characters

In the case of a real person who tries to get to your money by faking another identity, the affective response may be understandable because there may be real-life consequences attached. However, people also can be swept away by fictional characters, which are sometimes completely imaginary. For a long time, research was focused on the identification of the observer with the hero or heroine (e.g., Oatley, 1995). Method actors claimed that they were so absorbed by their role that they actually 'became' the character, feeling what s/he felt. Readers and spectators would insist on being swept away by the vicissitudes of Gorki's *Mother* or Goethe's *Werther*, crying with the heroine or committing suicide like the hero. For these people, fiction became an extension to their real lives and in the terms of Chapter 4, such people lived in an illusion due to missing the signal (i.e. the fiction cues).

In studying stage actors (including Method actors) and theater audiences, Konijn (2000, pp. 13–17; 1999) found out that certain people at some point in time may feel some form of identification but that this state is momentary and happens infrequently. In studies with movie viewers (Konijn & Hoorn, 2005), observers of newspaper photos (Konijn & Bushman, 2007), and gamers of violent video games (Konijn, Nije Bijvank, & Bushman, 2007), identification could easily be captured under the heading of extreme 'involvement.' In addition, these studies showed that 'liking' or 'appreciation' of a character was not merely a function of involvement but also of a compensatory tendency of having cold and detached feelings towards the character, called affective 'distance.' Involvement and distance occurred simultaneously and together were supposed to predict the level of liking the character better than one of these variables alone.

If people are capable of being involved, at a distance, and like someone who they know is fictional, then obviously, it must be the realistic representation that brings about or enhances these effects. So we thought. We conducted an experiment with 20 minute excerpts from Hollywood feature movies (Konijn & Hoorn, 2005), in which we compared realistic versus unrealistic representations of morally good or bad characters that were either aesthetically pleasing or not (Figure 1). One of the main results was that the ethical side of the characters had the strongest impact on viewers, more than aesthetics and realistic representation. Liking of the characters was not affected by the level of being realistic unless it

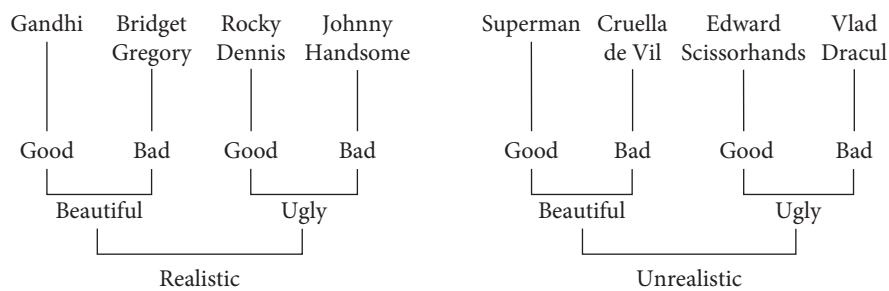


Figure 1. Hollywood heroes used in experiment (Konijn & Hoorn, 2005) (a, b, c, d, e, f, g, h).

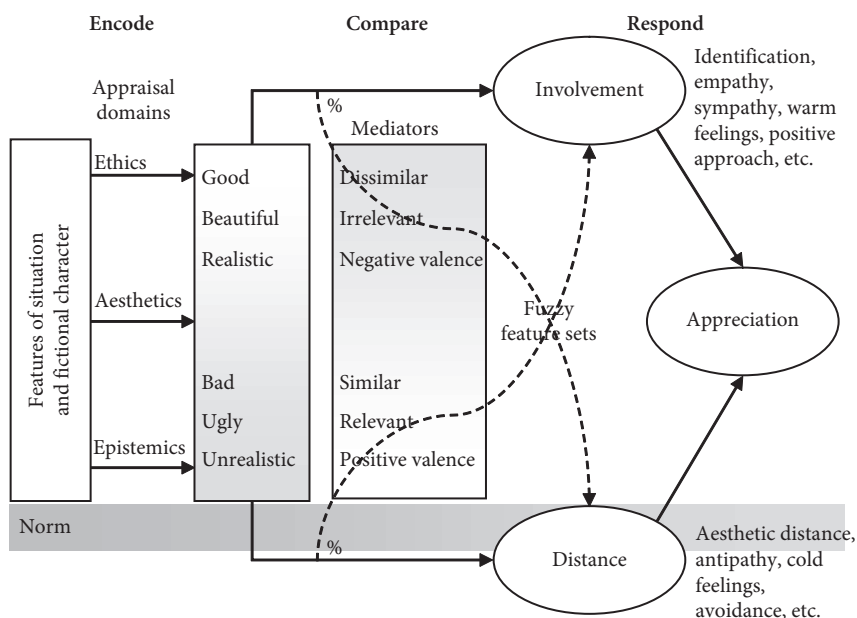


Figure 2. Perceiving and Experiencing Fictional Characters (Hoorn & Konijn, 2003).

was combined with ethics (i.e. good and realistic was liked better than good and unrealistic; bad and *unrealistic* was liked better than bad and realistic).

These and other results were integrated into a framework for Perceiving and Experiencing Fictional Characters (PEFiC) (Hoorn & Konijn, 2003; Konijn & Hoorn, 2005). PEFiC distinguishes three phases in engaging a character, as Figure 2 illustrates. In the encode phase, the character is judged for his or her moral

fiber (good or bad), aesthetics (beautiful or ugly), and epistemics (realistic or unrealistic). The character should not be seen as an individual in isolation; the observer also takes into account the situation in which the character acts when appraising features.

In the comparison phase, the good, bad, ugly, realistic etc. features are compared with the characteristics of the observer and his or her situation, leading to a measure of (dis)similarity between character and observer. By and large, similarity will lead to positive affect if it reminds of positive personal traits or positive outcomes, else dissimilarity is preferred. Apart from comparing features between character and observer, features of character and situation are also compared to the observer's goals (e.g., do I learn something from this, does it matter to my personal life?). The measure of relevance to the observer's goals determines the intensity of involvement with and distance towards the character that the observer will sense. In addition, a measure of valence determines the direction of the sentiment: If the observer feels that the character will positively contribute to the observer's goals (e.g., affirmation of moral standards), tendencies of positive approach are exerted. If the character is expected to harm the observer's goals (e.g., insulting, misleading people), tendencies of negative approach (e.g., censorship) or avoidance (e.g., leaving the room) will emerge.

During the response phase, three experiential dimensions come to the surface. Involvement is the tendency to become friends with the character and is accompanied by warm feelings. Involvement nourishes on the positive approach tendencies, the relevance to personal goals, good, beautiful, and realistic character features. Distance is the tendency to antagonize the character and is accompanied by cold feelings (e.g., antipathy, aversion). Distance is fed by negative approach and avoidance, irrelevance to goals, bad, ugly, and unrealistic characteristics. During character engagement, involvement and distance occur in parallel and compensate one another.

Distance is not necessarily a bad thing and involvement not necessarily a good thing. The Celebrity Worship Syndrome illustrates that too much involvement with a mediated figure leads to unhealthy fascination for the person, expressed by neurotic, moody, and stressed behavior (Maltby et al., 2006). A healthy distance towards misery enables to respond sensibly to a threatening situation. A good example of involvement simultaneously compensated by distance is humor and laughter. On the one hand, laughing causes friendly feelings towards the character but at the same time dissociation from a ridiculous or horrible situation (cf. Meyerhold's and Brecht's "*Verfremdung*"). Together, involvement and distance predicate the level of appreciation or liking the character.

There is one complicating matter that was never resolved before the PEFiC framework was launched. Sometimes, positive features evoke negative effects

(e.g., the good character is a bore) and vice versa: Negative features have positive effects (e.g., the bad character is funny). If the observer wants the hero to win, his treacherous behavior, lying, and killing (ethically bad traits) will be positively evaluated. In America, men went to the psychiatrist for the first time because if a cool guy like gangster Tony Soprano did it, they could do it too (Gabbard, 2002). In PEFiC, therefore, a feature of a character or situation can participate in multiple sets. An unrealistic feature, then, may also have a partial membership in the set of beautiful things. The ethically bad behavior not only triggers distance but contributes partially to involvement as well: Through the mediation of positive valence, the observer expects that unscrupulous behavior will, for instance, restore a desired situation (e.g., peace and prosperity).

In Figure 2 above, this mechanism is depicted by the dashed arrows and the %-sign. What is good, beautiful, and realistic goes into involvement but can partially be redirected towards distance through the effects of dissimilarity, irrelevance, and negative valence. Reversely, what is bad, ugly, and unrealistic can for a certain percentage be redirected towards involvement due to its similarity with the observer, relevance to the observer's goals, or positively valenced outcome expectations.

Finally, all these personal judgments, appraisals, and affective tendencies are regulated by the norms of the socio-cultural group that one wants to be associated with ("What do the others think of it?"). A person who wants to be of good standing is never allowed to think low of Shakespeare or to praise the eternal genius of Benny Hill. The characters these authors created, then, are always appraised with a bias that is caused by the norms of the socio-cultural group the observer wants to be associated with (cf. Hoorn & Van Vugt, 2006).

3. Embodied agents

In the *Media Equation* (Reeves & Nass, 1996), the main assumption is that "media equals real life." From a series of experiments in which Reeves and Nass replicated social-psychological studies by replacing people for computers and televisions, these authors concluded that people treat and respond to media in the same way as to people in everyday life, applying the same social rules, treating computers and televisions as normal social actors.

These studies inspired software houses such as Microsoft to humanize the computer interface in applying so called embodied agents, software that can act on behalf of the user and that has a humanoid look and feel. Embodied agents in the interface were thought to make computers easier to handle and more user-friendly (Figure 3). Laurel (1991, p. 356) stated that:

An interface agent can be defined as a character, enacted by the computer, who acts on behalf of the user in a virtual (computer-based) environment. Interface agents draw their strength from the naturalness of the living-organism metaphor in terms of both cognitive accessibility and communication style. (p. 356)



Figure 3. Microsoft's Office Assistants for Windows, versions 97 to 2003.

However, in many cases, all these little helpers in the interface were despised and dumped by their users because, after being entertaining initially, they were considered useless (Bayesian algorithms) and annoying later on (repetitive behavior). Perhaps, being polite and helpful but not at the right moment was not what people wanted from a life-like character.

A completely different route was followed by game characters. Being overly simplistic at first, these agents grew into round characters that combined good and bad traits, supported by incredible AI-systems to regulate a convincing game-play (Figure 4). Perhaps the mix of positive and negative traits was more life-like than the flat characters of the Office Assistants.



Figure 4. The evolution of Nintendo's Mario and friends (a) from a rough set of pixels into smooth graphic design and the intricate round characters of Fable II (MS Xbox 360) (b).

These two contradicting trends – the rise of game characters and the decline of Office Assistants – inspired us to study the involvement-distance trade-off with interface and game characters from a PEFiC point of view. The first thing we did was supplying PEFiC with a process that described the user experience of the agents as a tool for interaction. We looked into the Technology Acceptance Model (Davis, 1989; Figure 5) to combine the process of engagement (the embodied agent as a person described by PEFiC) with the interaction process of regarding the agent as a tool to achieve user goals. This framework we called Interactively Perceiving and Experiencing Fictional Characters (I-PEFiC), which was tested in a range of experiments from virtual museum guides, to synthetic advisors, to game characters (Van Vugt et al., 2009).

What follows is an overview of the agent studies and references for further details to the respective research papers. The main issues we wanted to resolve were whether features that are typical for the agent as a character could affect the

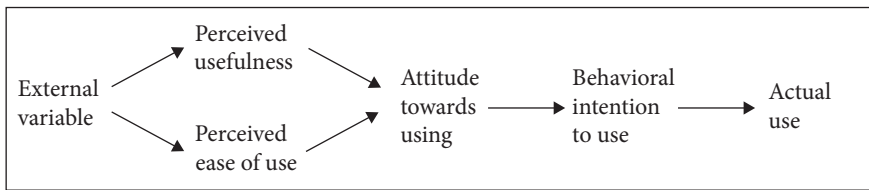


Figure 5. Technology acceptance describes the process from perception of the tool to actual use.

perception of the agent as a tool ('if it looks good, it is usable'). Vice versa, we wanted to know whether features that are typical for the tooling side could affect the engagement with the agent as a friend ('because it is handy, I like him'). In addition, we wished to challenge the long held conviction in the design of computer graphics, that realism, naturalness, as well as lifelike appearances and behaviors are the golden standard to follow.

3.1 Realism is not crucial

We started to investigate whether realism of an embodied agent was important for exiting involvement, distance, and use intentions in human users (Van Vugt et al., 2007). We developed an application, a virtual museum tour, that instructed curators how to install an artwork, *Stone and Feather*, created by the Dutch artist Marinus Boezem. Participants were instructed by a virtual tour guide that was depicted realistically (shirt and tie) or that was depicted unrealistically (beak, claws, and wings) (Figure 6).

The underlying assumption was that the more realistically an embodied agent looked and behaved, the more positively users would respond to it. It was indeed so that epistemic appraisals of the level of realism of the agent contributed to user involvement and distance. However, user perceptions such as the aesthetics of the agent, estimates of its moral stance, action possibilities (affordances), and relevance to the user task impacted user involvement and distance more than realism did.

In other words, although people may think that fiction is not true and characters do not look realistically, that does not matter for the affective side of things. People can be fully engaged with fiction without feeling the necessity that things have to be real. There does not need to be truth in art as long as it is morally provoking, of aesthetic interest, preferably has interaction possibilities, and is relevant to the perceiver's goals.

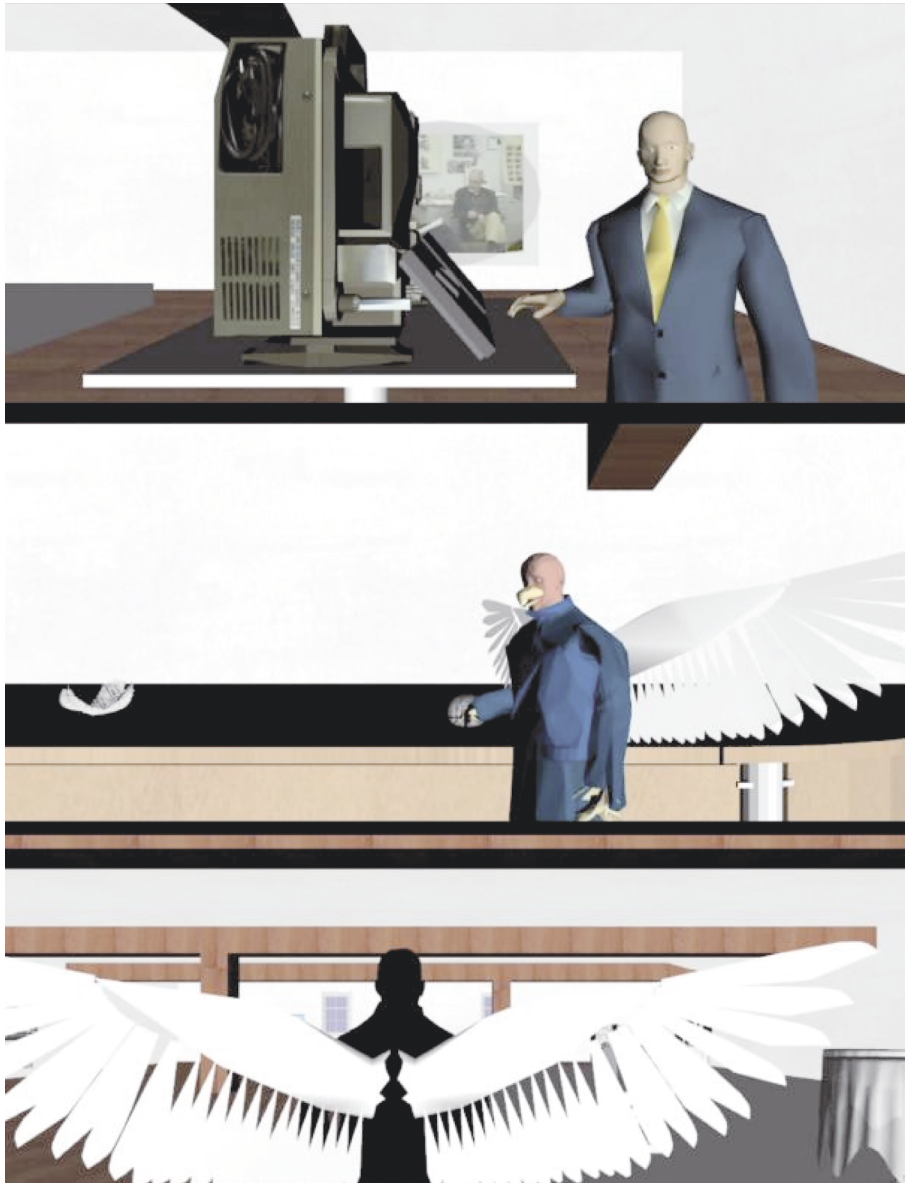


Figure 6. Virtual museum tour guide with either realistic (upper panel) or unrealistic appearance (middle and lower panel).

3.2 The burden of beauty

In the previous section, we saw that as long as people are aware of the fiction, the level of realism is not so important for being engaged with a character. We then turned to a combination of aesthetics (PEFiC, Figure 2) and affordances (i.e. what you can do with the agent) (TAM, Figure 5) to explore their effects on involvement, distance, and use intentions (Van Vugt et al., 2006). We manipulated the Sims2 game such that we had two embodied agents, beautiful Bella and ugly Berta (Figure 7). Moreover, we made them either skillful or clumsy in helping the user out on a number of tasks, such as cooking, cleaning, and doing logic. Thus, we created four conditions in which users interacted with the embodied agent: skilled Bella, clumsy Bella, skilled Berta, clumsy Berta.

Intentions to use the agent were strongest when she was both helpful and beautiful (skillful Bella). Beauty may be precious; it is also capricious. When Bella was clumsy, users were *least* willing to use her again although this judgment did not harm their engagement with the clumsy beauty. On the contrary, blundering Bella evoked the highest levels of involvement and the least distance. Silly beauties are nice but good for nothing.

Silly uglies could not count on any mercy. They were deemed least involving and most distancing, yet seen as somewhat more useful for the task than the silly beauties. Thus, beauty seems a dangerous treasure to cherish. It is a catalyst of extreme judgments. When you are beautiful, you are expected to perform better than others. If not, you are a lousy worker but still very nice. Uglies better offer some help to be appreciated. A skillful Berta exerted moderate intentions to use, moderate involvement, and moderate distance. This seems like default attitude that is directed at the most common type of person we encounter; not too beautiful, usually helpful, evoking in us mild feelings of sympathy and reservation.



Figure 7. Sims2 characters: Beautiful Bella and ugly Berta and their skills.

These results established with fictional characters were corroborated by experiments with real people (Andreoni & Petrie, 2008). The beautiful received more rewards than the ugly with equal performance. Beautiful people were by default overestimated for their level of performance and if they did worse than expected, they were punished more than ugly people.

This becomes all the clearer, considering that in our experiments, the skillful Bella not only raised strong intentions to use her and strong involvement, she also raised the same level of or even more distance than her ugly but helpful competitor. A top-performing beauty is suspicious: Someone to keep an eye on, because she may be a joy but a strong rival as well. Ugliness is more normal, less attractive but also less threatening.

That beauties are more dangerous and raise increased distance compared to their ugly counterparts was also found with film characters (Konijn & Hoorn, 2005). Of all the characters under study (see Figure 1), morally bad characters evoked less distance and more involvement when they were ugly (Johnny Handsome, Vlad Dracul). When they were beautiful (Bridget Gregory, Cruella de Vil), distance increased, and involvement decreased. It might be that observers felt that beautiful people are in a socially privileged position. Beautiful people already receive more social rewards and are not supposed to go beyond that by ruthlessly exploiting their looks to their own benefits. Ugly people, however, are in a socially weaker position, which makes their misbehavior more understandable: How else would they get what they need?

In this respect, De Montaigne (1580) ones stated: “A person’s look is but a feeble warranty; and yet it is something considerable too; and if I had to lash them, I would most severely scourge the wicked ones who belie and betray the promises that nature has planted in their foreheads; I should with greater severity punish malice under a mild and gentle aspect.”

3.3 Affordances and ethics are key

The findings reported in the previous sections already suggested that what you can do with a (fictional) character and what his or her moral fiber is largely determine how we feel, more than realism does. Our next step was to see whether facial similarity of the agent with the user would positively affect involvement – even when the agent was incompetent. We also measured the level of perceived realism as a competitor of facial self-similarity.

To do so, we went to the Virtual Human Interaction Lab at Stanford University (Figure 8) to use their 3D morphing software and conducted an experiment on self-similarity (similar vs. dissimilar) and affordances (skillful vs. unskilled agent) (Van Vugt et al., 2010).



Figure 8. The Virtual Human Interaction Lab at Stanford University.

We took pictures of the participants and modeled these pictures onto the agent they were going to interact with (Figure 9).

We used several grades of self-similarity so that participants worked with look-alikes (Figure 10) that were more similar or more dissimilar.

Participants worked on a science literacy quiz and agents could either give correct or incorrect advice in answering the questions (Figure 11).

In other words, four types of agents were used: similar-skilled, similar-unskilled, dissimilar-skilled, dissimilar-unskilled. In general, participants were more eager to use, felt more involved with, and less distant toward a skillful than an unskillful agent, an effect of affordances. As expected, facial similarity affected involvement with the agent but, surprisingly, to a lesser degree than affordances did.

Whether facial similarity affected the willingness to use the agent or not was dependent on gender. Male participants preferred to use a facially similar agent when the agent was skilled but preferred a facially dissimilar agent when unskilled. For women, this effect remained absent. Thus, when a man's agent is an incompetent advisor, it should not look like him!

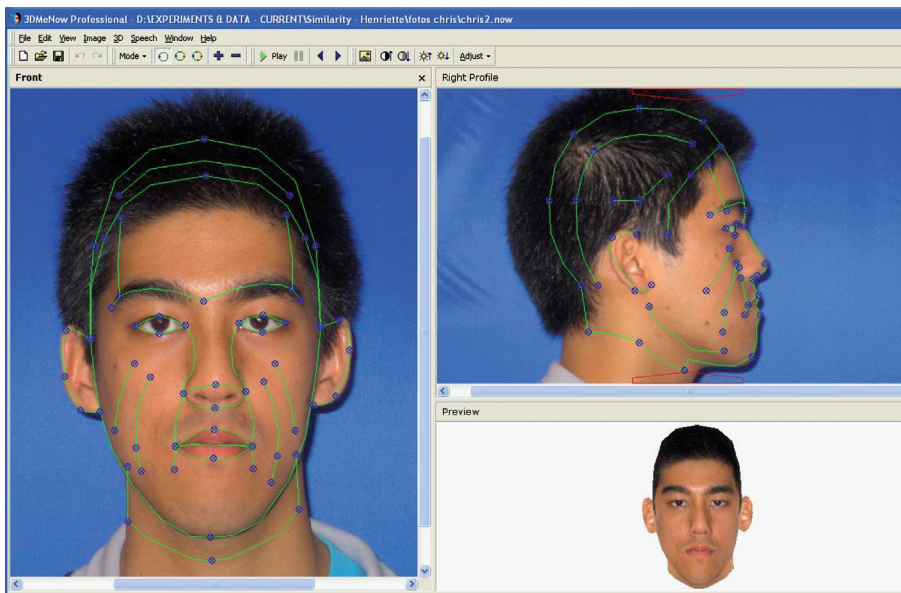


Figure 9. 3DMeNow, the image editor to create 3D lookalikes.



Figure 10. Eight sample heads in which a picture of the user was morphed onto the avatar with a grade of similarity (35%) that was not consciously perceived.

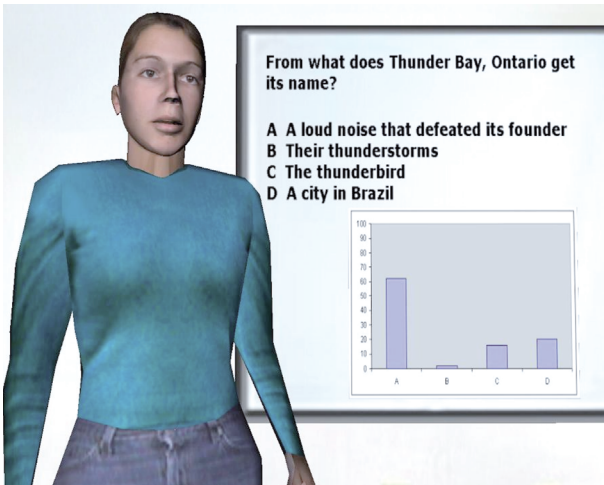


Figure 11. Example of an agent that advised on the answer to a question.

Box 1. Avatars that follow real life.

We found an interview with Stella Costello, an avatar on Second Life, in which the user was asked why the avatar was more full-figured than before (Figure 12).

Well, I'm not THAT much bigger than I was before... but I've always had my avatar chunky. I like big girls, I am a big girl in real life, it seems to fit me.

My avatar was perfect when I started! But I also felt disconnected from Stella. I think it was a gradual shift... I'd look at her and feel distant. Then I'd slide the slider up and feel more honest with myself and more connected to her. (User of Stella Costello, Feb. 27, 2007 at http://nwn.blogs.com/nwn/2007/02/all_about_my_av_3.html)

Figure 12. Stella Costello (a, b).



Throughout this experiment, the level of perceived realism was not important and did not cause significant effects. Affordances were most important and self-similarity only mattered when the men's agents were messing up.

Thus, the action possibilities that the agent afforded were again key for how they responded to him or her as a friend. Yet, we could not imagine that self-similarity played a subordinate role. We found an avatar user (Box 1) who expressed that she was a big girl in real life (realism), that she wanted to make the avatar more similar to her body shape (similarity) and feel more honest with herself (ethics) and less distant and more involved ("connected"). Therefore, we compared the similarity in body-shape between user and avatar with the user-determined ideal body shape. We compared how users saw themselves with how they would like to be to see the effects on engagement and use intentions. Again, we measured the level of realism of the agents as a control of the results.

We administered a lab experiment with experimentally manipulated e-health advisors. Similar advisors were used in a parallel field study in which the advisor served as an Internet application on Knowledge Link (Kennislink), a Web site related to science information and education. We investigated the effects of the outer appearance of agents (body-shape similarity and idealness) on the various user responses. We modernized and animated the characters of the widely accepted Figure Rating Scale (Stunkard et al., 1983) to index people's body mass, and used these figures as the embodiment of the health advising software (Figure 13).

In contrast to what might be expected from prevailing anti-fat norms in Western society, the heavier e-health advisors were perceived as more trustworthy (an aspect of ethics) than the slim ones. As a result, the heavier e-health advisors

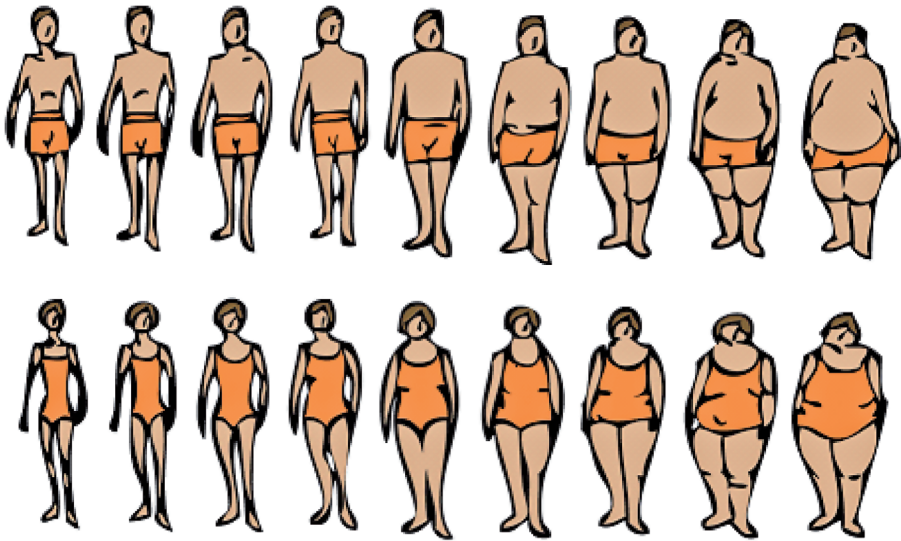


Figure 13. Modernized version of the Figure Rating Scale (Stunkard et al., 1983), animated as health coaches during the lab and online experiments on Kennislink, a science communication Web site.

were more involving, and less distancing than slender e-health advisors, also for slender users. Furthermore, heavy advisors also evoked stronger intentions to use them again. In other words, non-idealness (overweight) was more important than body-shape similarity for explaining involvement with, distance towards, and use intentions, even for slender people. That is, the non-idealness of the agent's body shape affected engagement and use intentions. Note, however, that this was an indirect effect via perceptions of ethics (is the agent perceived as good or bad, trustworthy or untrustworthy?). The level of perceived realism exerted no significant effects.

3.4 Interactively Perceiving and Experiencing Fictional Characters

Our conclusions from the embodied agent experiments were that we should envision an interaction process, evoked by perceptions of affordances, and an engagement process, evoked by perceptions of ethics (accompanied by aesthetics and realism) (Figure 14).

Relevance, valence, and similarity should be regarded as mediators in between the encode factors and the response factors of involvement, distance, and use intentions. The series of experimental studies showed that, first, both engagement

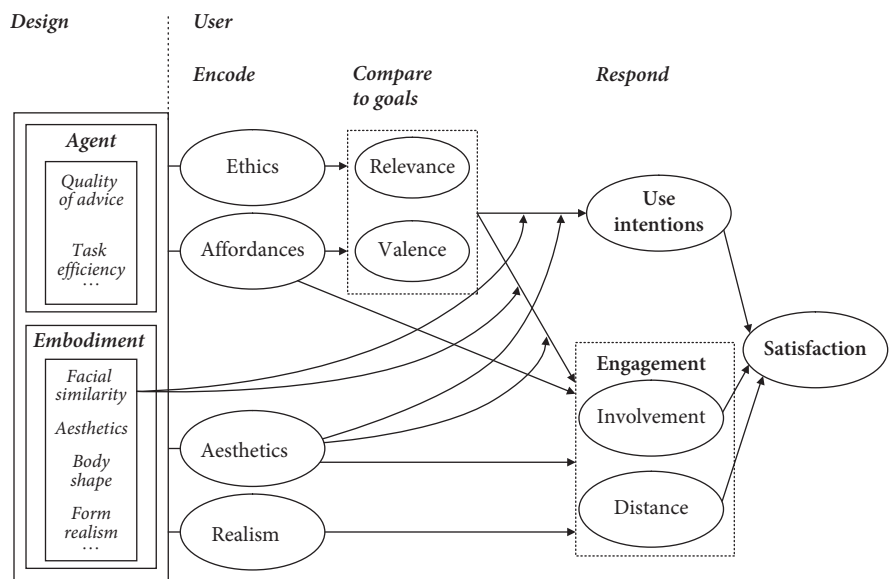


Figure 14. Interactively Perceiving and Experiencing Fictional Characters (I-PEFiC) (Van Vugt et al., 2009).

and use intentions contributed to user satisfaction. Second, both affordances and ethics played a major role in engaging with and intending to use an embodied agent. Relevance and valence served as mediators in between these encode and response factors. Third, facial similarity, aesthetics, and realism contributed to engagement but realism was the least important factor of the three and aesthetics came in at second place. Unlike aesthetics and realism, facial similarity effects occurred without the participants noticing it. Fourth, aesthetics and facial similarity also contributed to use intentions, but always in interaction with affordances. In Figure 14, curved arrows indicate the interaction effects. Perceived realism, however, did not contribute to use intentions. Realism was conjoined by other factors to feed into engagement. Relevance and valence were no mediators in between the various appearance factors and engagement and use intentions. Clear-cut cross-over effects were observed for affordances (i.e. agent efficiency) that impacted user engagement and ethics (i.e. trustworthiness) impacting use intentions.

For experimental purposes, we artificially designed and selected those examples that would render clear results. In daily life, encounters with fictional characters are fuzzier than what our research suggests. By and large, I-PEFiC and PEFiC may describe the general process as based on relatively clear-cut cases but the factors of this process are severely blurred when we normally encounter fiction.

3.5 Beyond realism

With ethics and affordances being pivotal and perceived realism rather subordinate in how people respond to virtual people, there is something to say about the *Media Equation* as proposed by Reeves and Nass (1996). From the Media Equation it follows that game characters and embodied agents, software that can act on behalf of the user and has a humanoid look and feel, would be treated as if they were real people in real places.

However, although comparable processes may be involved and misattribution of truth can occur easily in documentary type of media, observers sometimes respond differently to virtual than to physically real people: In many cases, people know that an agent is a fictitious other. For instance, morally bad characters may be liked less in real life than in the role playing game *Fable II* (Peter Molyneux) (Figure 4),¹ in which sometimes the bad guys attract the most female attention. After all, real evil may have real-life consequences. In the physical world, it is harder to disqualify a person you meet as irrelevant than in the media. In the latter, there is always a button to switch them off. In fiction, higher degrees of artificiality allow moral boundaries to be flexible. When things become threatening, the unrealistic elements can be discarded as irrelevant (Konijn & Hoorn, 2005). Life-long friendships can be established with people who are not a handyman and clumsy at performing a task. It is just one aspect of being a human and not too important. For embodied agents that are designed to help people execute computer tasks, inefficiency is deadly and sooner or later leads to the bin of digital oblivion.

There is one other threat to gratuitously applying the Media Equation. If we treat virtual people and places as we do in the physical world, it means that everything that is found out in media psychology directly adds to and potentially can replace the bulk of findings in social psychology, something that will not be recognized easily by that particular research community.

4. Personification

When in *The Winter's Tale* (Shakespeare, 1610–11), Time declares to “please some, try all” and to spread “both joy and terror of good and bad” (Act IV, sc. 1, line 1) he suggests that he may bring happiness and sorrow in view of a positive or negative prospect but ultimately leaves no one untouched. Time does not only do so because he is the ruler of our futures but also because he is a personification.

1. Retrieved Aug. 29, 2009 from <http://www.lionhead.com/fable2>

A personification is a fictional character or narrative agent who is the embodiment (objectification, substantialization) of conceptual entities such as classes, ideas, faculties of the mind, thoughts and feelings, speech acts, values, or fields of knowledge (philosophy, religion) (Paxson, 1994). Rhetorical tradition understands personification loosely as the giving of a human face or identity to something not human, usually abstract, such as Truth, Folly or Time (Paxson 1994, p. 1, also see Figure 15).

Personification is a special type of mediated figure or fictional character that has a metaphoric or symbolic meaning. Superman is the embodiment of honesty and the American way. The devil stands for evil. In Western eyes, Osama bin Laden exemplified terror; in the East, he embodied resistance against Western oppression; a symbol of freedom and Islamic virtue. In all these cases, an abstraction such as freedom, evil, honesty, or terror is represented by a living creature. A personification is a fictional character that is used as a metaphor for an abstraction (Hoorn, 2003). “Love is a drug” is a metaphor that is not a personification but “Love is a winged boy with an arrow and bow” is (i.e. Cupid, Figure 15).

Figure 15. Two personifications interacting: *Time Clipping Cupid's Wings*. Pierre Mignard (1694). Oil on canvas, France.



Metaphors have a descriptive, literal meaning as well as a figurative layer (Chapter 3). While time is fast (literal), the wings are figurative features of the old man (Figure 15), indicating the swiftness of aging. Based on similarity of velocity, the abstraction of time is enriched with two bird-like wings, emphasizing that time flies. This may be a proper analysis but it does not need to be that a viewer recognizes a personification in the old man clipping a boy's wings: It could be just a picture, a somewhat distorted representation of reality. Without looking for the meaning connections between the out-of-category elements of ‘time’ and ‘old man’ or ‘love’ and ‘boy,’ Cupid is just the depiction of a boy with certain realistic characteristics (e.g., curly hair) and some unrealistic characteristics (e.g., wings). Without seeing the metaphor in the personification, the fictional character is all that remains and forms a ‘literal’ form of communication with some unrealistic aspects, which are tolerated under the third Rule of metamorphosis (Chapter 3).

Many embodied and animated software agents that populate our visual and sonified interfaces are not recognized as personifications of an abstraction, although strictly speaking, they are. Microsoft's Windows, for example, featured a host of office assistants (e.g., Merlin, a dog, Einstein) to embody one and the same

search facility. These personifications state that “A search engine is a wizard, a tracker dog, or a genius,” respectively (also see Figure 3).

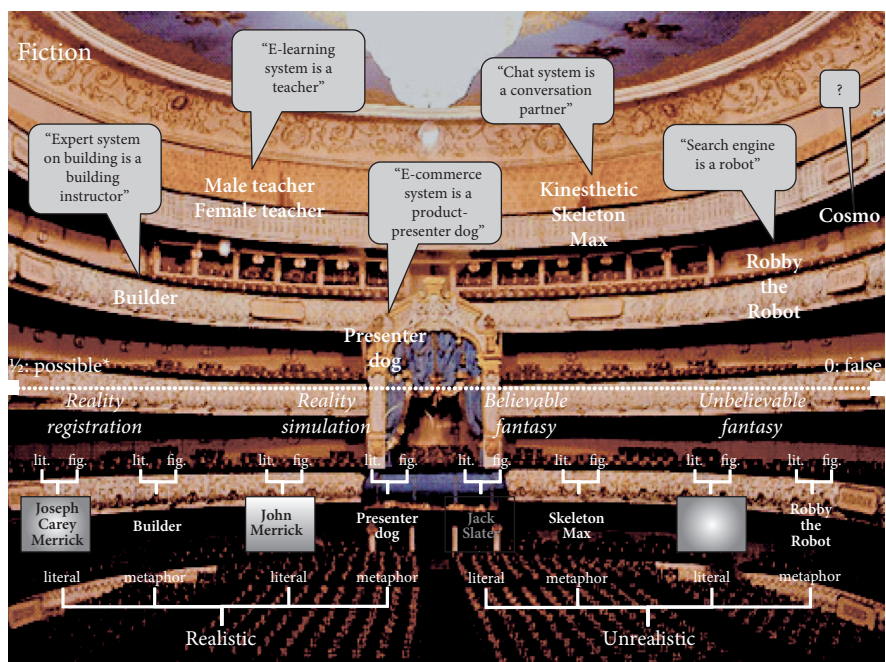
RealTimeAide’s (2003) building instructor depicted in Figure 16 is a personification of a tutor system but in daily use probably not recognized as such. We have a fictional character (the building instructor), used as a metaphor (“An expert system is a tutor”) for an abstraction (i.e. help). In daily practice, however, we perceive a little man on a screen who helps us with doing some handicraft and that is it: No metaphors perceived means that the fictional character equals a literal form of communication, depicting a more-or-less realistic construction worker. Robby Robot is somewhat more complicated (Figure 16). We have a fictional character (Robby), used as a metaphor (‘A search engine is like a robot’) for an abstraction (help, search, navigate). However, a robot could be analyzed (although not necessarily perceived) as a metaphor for human beings. Robots could be anything that acts autonomously from industrial car assemblers to Internet crawlers. Yet, Robby states that robots are like humans. In other words, Robby Robot incorporates a Homeric comparison that says: “Search is like a robot that is like a human servant.”



Figure 16. Two personifications of a software product. RealTimeAide’s building instructor exemplifies an expert system (a) and Microsoft’s Robby Robot represents a search engine with an extra metaphor added (b).

Figure 17 classifies a range of embodied software products on the dimensions of epistemics (realistic vs. unrealistic), communication forms (literal vs. metaphor), and feature types (literal vs. figurative). Additionally, I placed this grid in the Fiction domain of the fiction-reality framework (Chapter 1) and added the reality-based genre classification (Chapter 2). In unison, Figure 17 shows how the fiction-reality discussion, genre disputes, representations of realism, truth values, and metaphoricity are interrelated but stand for different levels of analysis, which, if not handled with care, give rise to confused academic debate.

Above the line of the truth continuum in Figure 17, I have indicated why all of the embodied agents are metaphors, analytically speaking. These metaphors are written down between double quotes (e.g., “A chat system is a conversation partner”). Below the line, I point out which examples are probably not perceived as such. To make it easier, I compared the embodied agents with fictional characters that in my view, carry no metaphor (although that could be intended or interpreted otherwise).



* Note: According to belief system or world view.

Figure 17. Personifications of software applications exemplify the relationships among truth values, genre, epistemics, metaphors, and figurativeness. Feature types can be literal (lit.) or figurative (fig.) (a, b, c, d, e, f, g, h).



On the far left of Figure 17, we see the picture of Joseph Carey Merrick (a), the man with *Proteus syndrome*, archived in the Royal London Hospital (also see Chapter 2). This picture is a literal communication form. It denotes the historic man himself. Joseph probably also evokes figurative features (e.g., ‘perseverance,’ or ‘patience’) but that does not make the communication metaphoric, unless these figurative features are explicitly used or perceived as connected to the literal features of another entity (e.g., strength of an elephant).

The same applies to the building instructor (b) next to Joseph Merrick. Although I categorized him as a metaphor, he will probably be seen as a literal communication form, depicting nothing more than a lifelike construction worker. If someone does perceive the metaphor in the builder, figurative features in the form of symbolic or conventional imagery should be attached to literal features of the other entity. To create a metaphor out of the builder, somewhat oddly, one could assume a context of free masonry where the abstract expert system he represents

could be framed as a 'Hiram' and 'redeemer' (Ankerberg, Weldon, & Burroughs, 1989/2009, p. 66), solving your construction problems.

I placed Joseph Merrick and the building instructor under the genre label of *Reality registration*. For the builder, however, this is actually allowed only if he depicts or people think he depicts a really existing building instructor. If he is just an actor dressed up, he should be under *Reality simulation* (see next).

Right from the builder you see John Merrick from the movie *The Elephant Man* by director Lynch (1980) (c). This character refers to the same entity in reality as Joseph Merrick and to nothing else. It states that there has been a man in history who suffered from bodily deformations. Therefore, he is a literal communication form that quite like Joseph can evoke figurative features but does not have to. Note, however, that I made John's background rectangle a little more vague than that of Joseph. This is to express that the more we move on the axis of truth values towards 'false,' the more figurative features occur and become salient (see Jack Slater, below). The background noise (literal features) increasingly overlaps with the signal (see Chapter 4), making the feature ambiguous meaning-wise. The true difference between Joseph and John is that John is not a recording of Joseph but a rendition of him and thus, John belongs to *Reality simulation*.

Next to Joseph is a product-presenter dog (d), the embodiment of an e-commerce application. The literal features of this personification are that it depicts a dog with four legs, two eyes, one snout, curly fur, etc. Because it is a drawing, however, it is slightly less realistic than the photo of the builder and, of course, dogs do not speak human language. The figurative features that connect the dog to a human product presenter are that dogs can drool on you as well, and that they try to be cute to draw your attention. Because humans can speak and dogs cannot, the humanoid virtual tutors are closer to the builder on the reality dimension (epistemics) than the dog. However, because they are drawings and not photographs, the tutors are less realistic than the builder. The tutor characters epitomize a fuzzy transition between reality simulation and believable fantasy but under the condition that they were drawn after truly existing people. Else, they are just believable fantasy. The dog is even closer to that genre cluster.

Next to the dog is Jack Slater from the movie *Last Action Hero* (Tiernan, 1993) (e). His background rectangle is very vague. As argued in Chapter 2 on genre attribution, Slater moves in the realm of believable fantasy because he has access to magical things: He is not harmed by bullets and jumps through walls that open up to another world. Many perceivers will see the depiction of this human daredevil as a literal form of communication and not as a personification: Here is a man who knows how to handle problems. That's it, no further meaning perceived. Yet, the picture of Slater is made vague to indicate that as soon as we enter fantasy genres, the literal side of the features (e.g., muscular, has gun, grins) may get

overpowered by the figurative side (e.g., potent, fearless, passionate knight). Thus, the normal distributions of literal noise and figurative signal tend to grow closer (see Chapter 4) in adventure and fantasy. When people argue that Slater stands for toughness, being cool, an avenger, he turns into a metaphor and more specifically, a personification.

Right from Slater is a kinesthetic skeleton of a conversational agent called Max (f). Actually, Max is the embodiment of a chat program and the communication with it is thus personified. The literal features are that he has a head, arms, legs, a wireframe, gray color, and can talk. The head is realistically depicted but the wire-frame makes the body unrealistic. The figurative features might be that because he talks to you, he is cozy companionship but because of the wire-frame body, he has a restrained personality.

The empty box next to the conversational skeleton is a challenge to us all. Try to think of a character that belongs to unbelievable fantasy (e.g., Doom III, Alice in Wonderland, Spiderman) that has literal features without being attached to figurative aspects such as being the incarnation of evil, goodness, curiosity, or toughness. Of course, all characters have literal features (e.g., hands, eyes, legs, red-and-blue spider suit) but they will have plenty of figurative meaning attached to them (e.g., symbols of death, love, belief, sorcery). In unbelievable fantasy, then, my guess is that the unrealistic representations entice metaphoric interpretations. In that sense, Robby Robot is not the prototypical example of unbelievable fantasy (g). After all, lifelike robots do exist (cf. Zou Ren Ti, Chapter 3) even in the form of a tin-can-man.

However, there is a limit to unrealistic representation and metaphoricity. The Cosmo creature on the far right is an Internet advisor and one of the earliest examples of a pedagogical agent (h). Because it is hard to tell what this creature actually represents (a hybrid of a human with an ant without feet), the metaphor is hard to understand: Advisory system is a human-ant. Because it is difficult to create connections between literal and figurative features of both advisory system and human-ant, Cosmo moves quite close to what may be considered 'false.' Therefore, he is more of an anomaly than a metaphor: It is hard to imagine why this creature stands for guidance and education.

We have seen that personifications garnish ancient art as well as modern computer interfaces and that they demonstrate the usefulness of the framework of literal-metaphor, realistic-unrealistic, true-false, and fiction-reality. If you disagree with my placement of the examples in Figure 17, it is now easier to point out exactly why you think so without confusing the terminology. In overlooking one of the analytical layers, one can erroneously decide that because a mediated person has more literal features, s/he speaks the truth and – *modus ponendo tollens* – a metaphoric figure does not.

All embodied agents are fictional characters but not all embodied agents are designed or perceived as personifications. In Figure 17, the tutor agents are realistically rendered. Although analytically, they are metaphors, they are easily perceived as literal or perhaps tautological representations of a teacher in the physical world (“The tutor is a teacher”). The virtual product presenter dog also is realistically rendered but for some people a metaphor might be interpreted – probably unintended by the sender (e.g., “Sales people are dogs”). Robby the Robot is an example of an unrealistically depicted servant. By some, Robby may be seen as a metaphor because he is the anthropomorphization of the search engine. Moreover, he personifies an abstraction: “Search engine is a robot,” or “Help is a mechanic man.” Another metaphor that could be construed is “Servants are robots,” that is, they are often regarded as stiff, formal, and restrained people.

Not everybody is a seeker of deeper meaning. Usually we look for meaning beyond the given if we apply Grice’s (1975) axiom to the extreme. We give the sender almost unlimited credit that s/he sends us nothing but relevant information, suspending disbelief to whatever we find counter-intuitive at first sight. We usually take this position with certain hermetic poetry, postmodernist philosophers, or with religious exegesis. If someone asks “How do you do?” and the answer is “In every life some rain must fall,” we do not dismiss this answer as irrelevant but interpret rain as a metaphor for sadness and bad luck.

My argument about personification takes the form: We first identify a character and then later take the character to be a personification if we are open to its metaphoric aspects (cf. Chapter 4, sensitivity and tolerance). Presumably, we settle on a conception of what is personified and why this is a more-or-less suitable personification. Metaphoric communication triggers more than literal communication because descriptive as well as figurative information is set free. In personification, moreover, the communication triggers both the character as an impersonation of an abstraction and the notion that the character stands for something else than mere denotation. The non-metaphoric character would just trigger the character.

This theoretical proposal has intra- and interdisciplinary impact. Instead of the two traditional routes to an understanding of the mechanisms of personification, the linguistic-rhetorical and the philosophical-ontological, this idea fuses the theory on metaphor processing with the theory on engaging fictional characters (whether interactive or not). Metaphor theory can be extended with a context-dependent model on affective experience (i.e. PEFiC or I-PEFiC). The epistemic appraisal of fictional characters (realistic-unrealistic) can be expanded with a full-fledged model on metaphor processing. This is what I will do in the final Chapter 6, which synthesizes all of the insights advanced in this book.

5. Robots

In *We Can Build You* (1972), Philip K. Dick confronts us with robots that are replications (*simulacra*) of historical figures such as Abraham Lincoln. These robots incorporate affective mechanisms and one of the challenges to the reader is whether a robot that loves and cares for others is less of a person than a borderline psychopath who does neither (cf. Olson's argument on non-psychological identity in Chapter 3).

Hanson Robotics Inc. developed robot lookalikes of Philip K. Dick (Figure 18). These robots are capable of facial expressions and incorporate an emotion system.² In other words, Dick became a *simulacrum* as if he had come out of one of his own novels.

Figure 18. HumanKind robot Philip K. Dick by Hanson Robotics Inc.



Certain people see the science fiction stories of Philip K. Dick as superior but nonsensical entertainment, whereas others see it as a warning against “the misery and frailty of human existence” (Any Muir, 1978).³ The novelist Dick may show us the gloom and doom of technology use, but there are many examples in which using a robot may be a relief. Figure 19 shows among others a computer-controlled baby simulator at the Wenckebach Skills Center of the University Medical Center Groningen with realistic heartbeat and breathing.⁴ The baby communicates by crying, while moving up and down its chest. Surgeons and students practice difficult operations on the robot without having to exploit real babies.

Figure 19. Patient simulators.



In our own lab, we develop the affective side of robot behavior, thereby focusing on emotion regulation. As a starting point, we used the I-PEFiC framework and turned it into an artificial intelligence (AI) system that gives the robot the

2. Retrieved Aug. 27, 2009 <http://www.hansonrobotics.com/robots.html>

3. Retrieved Aug. 27, 2009 from http://www.philipkdick.com/works_novels_wecanbuild.html

4. Retrieved June 27, 2006 from <http://www.beleidsimpuls.nl/fig/computerbaby.jpg>

possibilities to establish an affective relationship with its user. Such robots are useful as conversation partners, game characters, virtual therapists, or health coaches.

5.1 Robots becoming irrational

Most AI systems are directed at modeling logical behavior. There are many reasoning and diagnostic systems available, and only recently are researchers penetrating the affective domain. We used I-PEFiC to model affective behavior of robots and additionally developed a module for Affective Decision Making (ADM) to simulate irrational robot behavior, which we abbreviated to I-PEFiC^{ADM} (Hoorn, Pontier, & Siddiqui, 2008).

Figure 20 illustrates that during encoding, the robot appraises a user’s features for their level of *ethics* (good or bad), *aesthetics* (beautiful or ugly), and *epistemics* or realism (realistic or unrealistic). Moreover, the robot evaluates in how far the user has *affordances* (aids or obstacles), action possibilities that make the user functional as a tool to achieve robot goals (e.g., maintenance, energy supply).

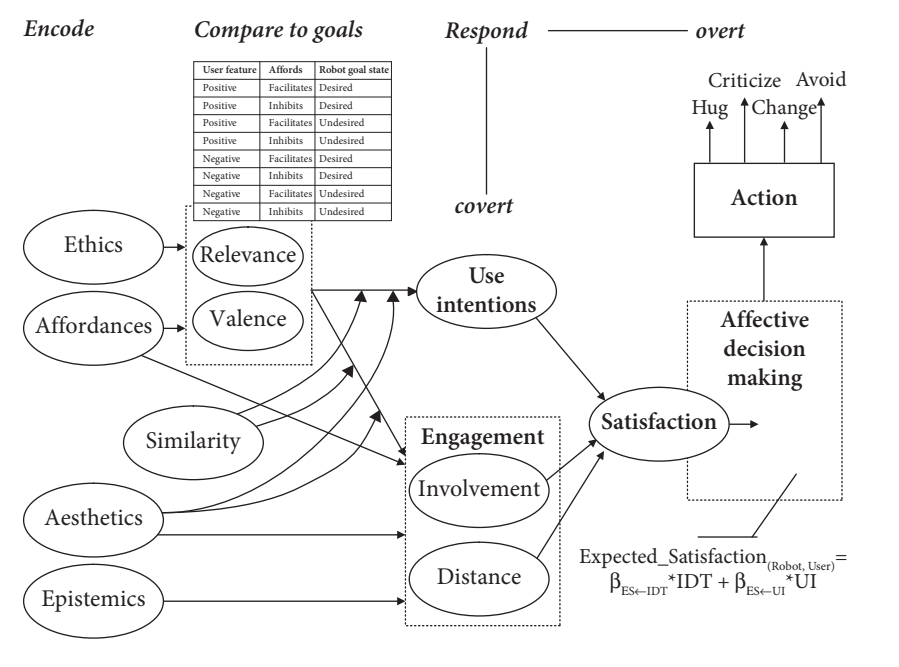


Figure 20. Dependencies in I-PEFiC^{ADM}. Curved arrows indicate interaction effects. IDT = involvement-distance trade-off, UI = use intentions.

In the comparison phase, the *relevance* of user features to robot goals is assessed (relevant or irrelevant) and *valence* to goals (positive or negative outcome expectancies). Relevance determines the intensity of the effect $[0, 1]$, while valence determines its direction $[-1, 1]$. User features (e.g., intentions) encoded as positive (e.g., ‘good’) may afford the facilitation of a desired robot goal, for example, to have maintenance every once in a while. This instigates positive outcome expectancy. As we saw in Section 3.4, this type of comparison is more important to engagement than the comparison between the features of robot and user, which establishes a level of *similarity* (similar or dissimilar). The measures in the encode phase – mediated by relevance and valence in the comparison phase and moderated by similarity – determine the robot’s responses.

In the response phase, the robot establishes the levels of *involvement* with and *distance* towards the user. Involvement and distance are two tendencies that occur in parallel and compensate one another. This trade-off in the engagement process is accompanied by specific emotions, which may differ in each particular case. In addition, the robot calculates a value for the so called *use intentions*, the willingness to employ the user again as a tool to achieve robot goals. Together with involvement and distance, the intentions to make use of the robot determine the overall satisfaction of the robot with its user.

Based on this level of *satisfaction*, the robot may decide to continue or stop interaction and turn to another user. In the Affective Decision Making module (Hoorn, Pontier, & Siddiqui, 2008), the expected satisfaction (ES) of interacting (again) with a user is calculated by compensating involvement (I) with distance (D) and calculating a weighed mean of the involvement-distance trade-off (IDT) together with the use intentions (UI). Thus, the robot makes a decision on the more *rationally* generated use intentions in unison with the more *affectively* generated involvement-distance trade-off. In other words, the robot can decide to lose a game because it likes its user so much (see Section 5.2) or in interaction with other robots, it may allow risky behavior if that makes a loved one happy (Hoorn, Pontier, & Siddiqui, 2011).

In a multi-user setting, the user that promises the highest expected satisfaction during interaction is selected by the robot and four overt actions are calculated from which the robot can choose: positive approach (e.g., compliment the user), negative approach (e.g., criticize the user), change (e.g., teach the user), or avoid the user.

Recently, we enriched the I-PEFiC^{ADM} (Figure 20) with extra mechanisms for emotion regulation (e.g., being angry but not showing it, reframing a set back into a learning experience) (Bosse et al., 2010) and tested it with real users. In a speed-dating experiment, young adult females were dating a male avatar that incorporated our software (Pontier, Siddiqui, & Hoorn, 2010). Although the girls

knew they were dating a robot, they judged that its emotion expression and overt decision behavior closely resembled male dating behavior (the control condition). Certain aspects of the covert structure that produced such affective behaviors differed between robot and human dating partner, whereas other aspects were perceived as the same.

5.2 The Pongo project

Currently, we are working together with Aernout Mik, an installation artist who exhibited at MOMA in New York. One of his older works is an orangutan animatronics called AAP (Ape) with an AI system that can play tic-tac-toe and simulates emotion expression. Aernout makes it a point that his art is relevant to the public. Therefore, he placed the orangutan in a clinic for physical revalidation as a healing environment for the patients to play with (Figure 21).



Figure 21. Aernout Mik's orangutan animatronics.

As this book is being printed, the current plan is to rebuild the orangutan and install it in a psychiatric clinic for depressed patients. The research purpose is two-fold. We will implement our software and explore whether healthy participants feel that with our system the monkey shows natural affective behavior. For example, after two rounds of winning the tic-tac-toe game against a child, the monkey could decide to lose a game to ease its opponent's frustration. This is not a scripted function but based on how the user treats the robot (e.g., a pat on the back or not) and the way the robot builds up levels of affect. The other purpose is that clinical psychologists will investigate whether our system implemented in the orangutan robot makes a stay at the clinic a more pleasant experience.

The choice for an anthropoid ape for our experiments was not coincidental. This has to do with the eventuality of the "uncanny valley" (Mori, 2005/1970), a consideration about the affective response to an epistemic aspect of robots. Mori argued that a robot should not be too realistic and come too close to a real human to be appreciated. Industrial robots are not humanlike and therefore make an unfamiliar impression. Affectively, they do not evoke strong responses. Social robots such as the orangutan animatronics are humanlike enough to steeply increase experienced familiarity. But then the uncanny valley lies ahead. If you make a robot too humanlike but not yet perfect (e.g., Humankind robot Philip K. Dick), so Mori argued, it comes close to the experience of dead people and users will resign from it.

We preferred an anthropoid ape because primates are capable of showing human-like behaviors but deviations are still acceptable (cf. Chapter 4). That way, we avoid that the robot may be rejected *a priori* because it is too unrealistic (cf. *The Wizard of Oz*: ‘A tin man does not have a heart’) or because it is just not realistic enough (i.e. if it looks like a human it should behave like a human).

6. Plug your brain into the bot

The usual way for a robot to receive information about the user is through sensors (light, sound, touch) or input devices (e.g., the game board in Figure 21). An emerging field is that of the brain-computer interfaces (BCIs),⁵ in which the brain directly communicates with the computer by transmitting electrocortical activity. In most cases, this is done with EEGs in application areas that are often medical. People with spinal cord injury or brainstem stroke, for example, have no control over their hands but by training the neural impulses in their brain they are capable to control an electronic device or move a computer cursor over the screen (e.g., Wolpaw et al., 1991; 2002). The brain activity can be measured at the skull with an electrode cap (electroencephalography) or under the skull (electrocorticography) with a cortical implant wired to the computer (e.g., Schalk et al., 2004). In *The Cyborg Revolution* (NHK, Japan, aired Nov. 5, 2005), we see a man moving his artificial arm by thinking the movement and we encounter artificial eyes that are directly connected to the brain.

However, in many cases, wearing an electrode cap or artificial implant while communicating with the computer may not be too user-friendly. Therefore, other types of BCIs were developed, for example, with non-invasive (near) infrared systems (e.g., Coyle et al., 2004). Yet, these interfaces are still physically connected to the computer, which is unfortunate if we want to play and interact with computer-generated actors or robots in our living room. Therefore, researchers such as Scott Eaton, Gary McDarby, Rob Burke, and Ed Lalor of MindGames at Europe’s MIT Media Lab (Dublin) developed a prototype wireless, non-invasive headset called Cerebus (Figure 22).⁶

Figure 22. Cerebus, a wireless interface for brain-computer communication (a, b, c).



5. See for example International Assessment of Brain-Computer Interface Research (<http://www.wtec.org/bci/>).

6. Retrieved Sept. 5, 2006 from <http://medialabeurope.org/mindgames/>

With Cerebus you can play the game Mind Balance. A creature called Mawg (Figure 23) balances on a cord over a futuristic city. Cerebus measures so called visually evoked potentials (VEPs), which are electromagnetic pulses at the back of the skull where the visual center resides (the occipital lobes). If the creature slips off the cord at one side, you can restore its balance by looking at the other side. The changes in electric activity in the brain's visual center are transmitted to the computer (wireless) to put the Mawg back in place.



Figure 23. Mawg rebalancing.

My guess is that in the near future we will witness the merging of three exciting developments. Besides behavioral measures and video and audio recordings, non-invasive and wireless brain-computer interfaces such as Cerebus (1) will provide the input for statistical techniques (e.g., Markov models, Bayesian networks, Petri nets) to create and adapt models of user behavior online that humanoid robots will respond to (2). These user models are then confronted with the mind of the robot, its affective 'personality,' which can respond irrationally at times (3), depending on its goals and whether it likes or dislikes the user or has both experiences at the same time. In Figure 24, we see a predecessor of this idea except that the connection is not wireless and the robot has neither user models nor an affective personality yet.



Figure 24. Brain-computer interface by Honda. The user controls the ASIMO robot through mental activity (Business Wire).

If these developments come true, each time a creature such as Mawg (Figure 22) slips off the cord, the computer can count the number of times the user moves her eyes to the other side and translate this in terms of positive or negative valence. If the user helps Mawg by looking the other way, the creature will think of the user as a friend. If she looks too often to the same side, he will regard her as clumsy at best and unfriendly at worst. In both cases he might respond to the user with "I quit. I don't like you. You drop me too often."

Slowly, then, the biological brain of the user becomes entangled with the artificial brain of the robot, reckoning with each other's goals, concerns, and objectives. At that stage, we are not far any more from becoming 'naturally-born

cyborgs' (Clark, 2003). This makes it interesting to integrate and formalize our thoughts on fiction and reality, the attribution of truth, perceived realism, metaphor, and signal detection to formulate an *epistemics of the virtual* that the robot as an extension of our minds can work with. The first attempt to do so, you will find in the next chapter.

7. Afterthoughts: Robot affordances and ethical behavior

Becoming symbiotic with a system that has a mind of its own and can choose to tell a white lie out of sympathy with its user (an affective affordance) may be eerie to some people. Discussions of the potential harm or benefits of emerging technologies (i.e. geno, robo, info, nano) are abound (e.g., Kelly, 2010, p. 259) but I think they should neither focus on the 'innate' moral quality of a new device nor on the moral fiber of its maker or its user. Instead, the discussion should be about what drives the perceiver to state that a novelty is ethically acceptable or not. Irrespective of design and use intentions, perceivers deem technology good if it sustains personal objectives and bad if it frustrates those objectives. The discussion runs astray if the concern-driven position of the perceiver is covered up by misattribution of use intentions (the inventor did wrong) to design intentions (but he meant well) or the other way round. I will offer a 'moral matrix' to make the choice for a position easier in debates on the acceptability of technological innovations (whether old or new).

Rapid technological development may sometimes be overwhelming those who professionally or by natural disposition are not necessarily enthusiastic for the uptake of emerging technologies. Mistrust of science and technology or sometimes true technophobia (Brosnan, 1998) are driven by concerns for health, threats to social coherence, family, or cultural values. By contrast, innovators and early adopters take pride in setting a trend and purchasing the latest gadgets, not only because inventing and using technology is fun, brings status, or satisfies a taste for technophilic eccentricity (cf. Gauld & Goldfinch, 2006, p. 19, p. 133), but also because they foresee beneficial effects on commerce, creativity, security, establishing a civil society, and so forth.

In public discussions on the desirability of technological innovations (e.g., violent media, RFID, microwave scanners, or stem cell research), often the distinction is overlooked between the intentions of the *designer* and those of the *user* as perceived by the *observer* who makes a judgment. These three perspectives all have an impact on the moral assessment of a novelty: The designer may mean well, the user may be of bad intent, and the observer may think neither.

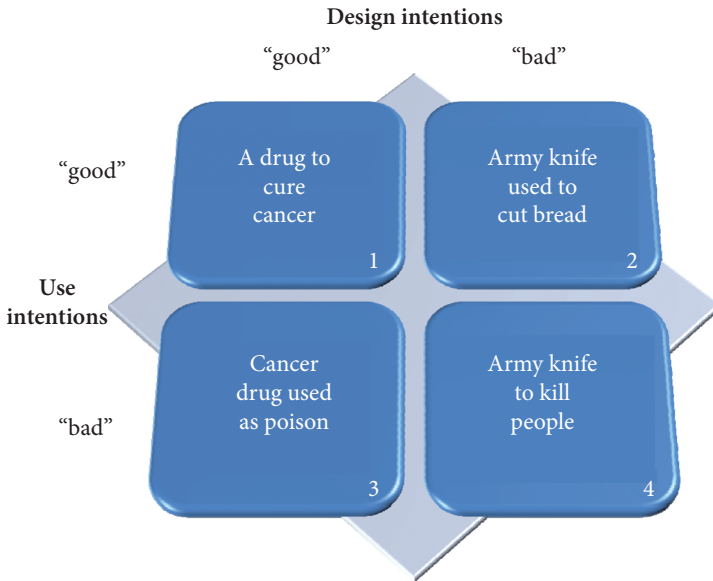


Figure 25. Design and use intentions as related to moral judgments.

Innovation diffusion theories as well as technology acceptance models predict the adoption of new technology from relative user advantages such as compatibility, level of complexity (ease of use), or perceived usefulness (see Karahanna, Agarwal, & Angst, 2006). Beyond matters of operating the interface and desired functionality, however, ethical considerations also determine attitude to information systems, software, and computer use; at the side of the user as well as the developer (e.g., Chopra & Dexter, 2009).

Certain tools and treatments are applied with the best of intentions – on the side of the designer as well as the user (1). A cure for cancer is an example (Figure 25, upper left). Other tools are made and used with the intention to inflict pain and cause death (4), for instance, a weapon (Figure 25, lower right). However, an army knife may be designed to cause injury, it also can be used to cut off a slice of bread and feed the hungry (2) (Figure 25, upper right). Reversely, a drug can be designed to ease the pain but also can be used to deliberately kill a person (3) (Figure 25, lower left).

In all four cases, desirability of the technology will depend on the observers, even when these observers are the designers or users themselves. If an individual's goals and concerns are sustained, the technology will be appraised as "good" (cf. Mason, 1995) irrespective of the positive or negative intentions with which it was designed or used. If goals and concerns are frustrated, the technology is regarded

as “bad” (ibid.) no matter what the design or use intentions were. In Figure 25, the position of the observer is represented by putting the moral judgments between double quotes, indicating that what is “good” or “bad” depends on the person.

If in the view of the observers, Case 1 or Case 4 applies, there will be no debate (cf. Hoorn et al., 2007). Case 1 will be accepted because design and use intentions converge to “good.” Case 4 will be rejected because both design and use intentions converge to “bad.” Case 2 and 3, however, contain a moral conflict, a dilemma, and give rise to “wicked problems.” These are cases of use that were not intended by the designer and can be regarded as creative use (framed positively) or perhaps even abuse (when framed negatively). Case 2 and 3 will lead to deliberations (cf. Hoorn et al., 2007) about good or bad design intentions as opposed to good or bad use. Arguments in Case 3 will run like “It was meant well but you use it in the wrong way” and in Case 2 like “Perhaps you may use it well but the thing itself is evil.” In the latter case, it may even be so that the bread seems to be tainted because it was cut by a thing that potentially kills people, a moral transfer effect.

The danger in these kinds of conflicts (Case 2 and 3) is that judgments of design intentions are misattributed to use intentions and vice versa because people tend to drive the conflict to the non-disputable situations of 1 or 4. This leads to ethical syllogisms of the kind:

1. “You cannot use XTC to treat clinical depression because the drug was devised for the wrong reasons” (bad design intentions overrule good use)
2. “There is no harm in killing unconvicted terrorists, if done in the name of democracy” (bad design intentions of the weapon overruled by its good purpose)

The assumed intrinsic moral value of emerging technologies and how people respond can be understood as a ‘moral matrix’ of design intentions crossed with use intentions, which are perceived by an observer as ethically “good” or “bad.” Potential application of the matrix ranges from discussions on bioinformatics to Petri dish meat and from the admissibility of psycho-pharmaceuticals to nuclear power. Often, people do not explicate or perhaps even realize that the actual source of the conflict is the misalignment of the tool with their personal concerns. They point at immoral design intentions or bad use to condemn an application that they perceive as a threat to desired goals or apologize immoral intentions and abuse by pointing at its good cause.

Whether old or new, technology is not inherently harmful or beneficial so that default techno-pessimism or optimism are equally unwarranted. There is nothing intrinsically good or bad about a tool (cf. Brey, 2008). There are design intentions and use intentions, which in the eye of the observer, may be judged as acceptable or intolerable.

Thus, our robots should be able to make an ethical assessment of design and use intentions at the level of the *observer*, whether the observer is the designer, the user, a third party, or the robot itself. To make that discussion clear, the robot should trace moral positions back to the goals and concerns that are felt to be at stake (e.g., when advising on drug intake or truth telling in general). In addition, the robot should signal the transference of a moral judgment from use to design or reversely, for which the moral matrix in Figure 25 offers a framework of robotic analysis (i.e. Case 2 and 3). In this way, virtual others become responsible partners in conversing affordances, including theirs and those of the user, for their ethical consequences.

CHAPTER 6

Epistemics of the Virtual

Synthesis

“The awkward richness of possibilities seems to shatter any possible coherent theory of simplicity.” (Slobodkin, 1993, p. 204)

The lessons learned throughout this book are combined in this chapter and integrated into a semi-formal process model of how the epistemics of the virtual work. This framework accounts for the fiction-reality confusion, attribution of truth, perceived realism, and metaphor as well as the experiential side of dealing with virtual people (e.g., ethical behavior). Its purpose is not only to improve our understanding of fiction with a sophisticated framework of analysis but also to lay the foundation for formal models to equip our virtual counterparts with so that everybody stays on the same page when holding the virtual against the actual. This is the book's final chapter and essentially an annotation of the final chart. To avoid repetition, I put more effort in constructing the chart than in its textual explanation, which is actually a summary of the book as a whole.

1. Physical world and culture as sensory input to the mental world

According to the epigraph in this chapter, we can only head for trouble if we wish to arrive at an overarching, coherent theory of fiction that is still intelligible but this is exactly what the current chapter aims at. Simplicity is probably not what we will achieve. This might be failure on my behalf or plainly because the things we want to understand are highly complex.

Figure 1 provides a semi-formal model of Epistemics of the Virtual. This model is meant to understand the relations between the fiction-reality framework, the establishment of perceived realism, metaphor processing, and affect formation with fictional characters. It can be used to make logical specifications in a formal language so to facilitate computer simulation and verification, and to deduce predictions that can be validated empirically.

Whether or not mental activity is physical, Epistemics of the Virtual assumes that mental activity takes place in the physical world or at least is surrounded by

Physical world

Concrete
events
situations
people
objects
(e.g., the brain)

Culture

Authority based on
religion
science
education
upbringing
socialization
physical strength (e.g., sports)
rules and regulations
(materialized mind – an
idea that is written down)

Mental world

Abstract
ideas
concepts
representations
generalizations
(e.g., laws, rules)
emotion and affect
(the mind)

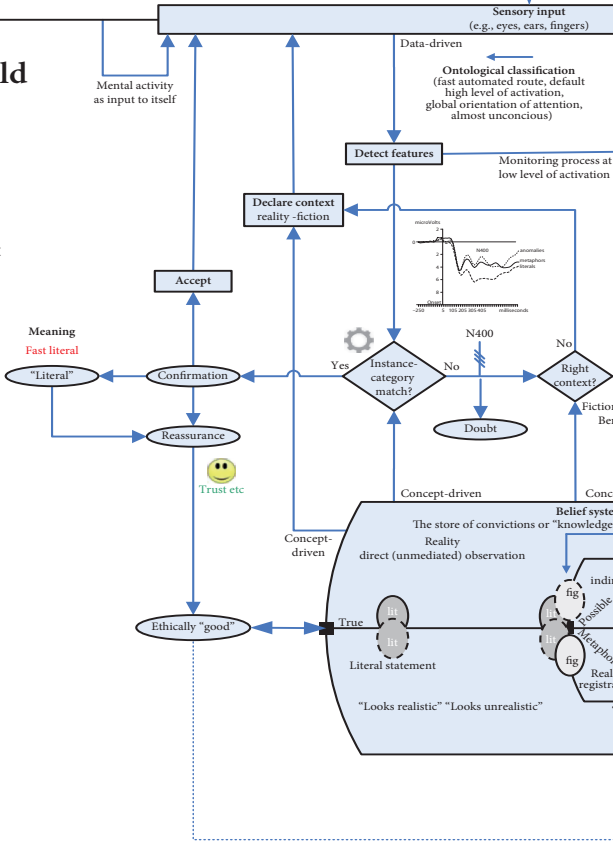
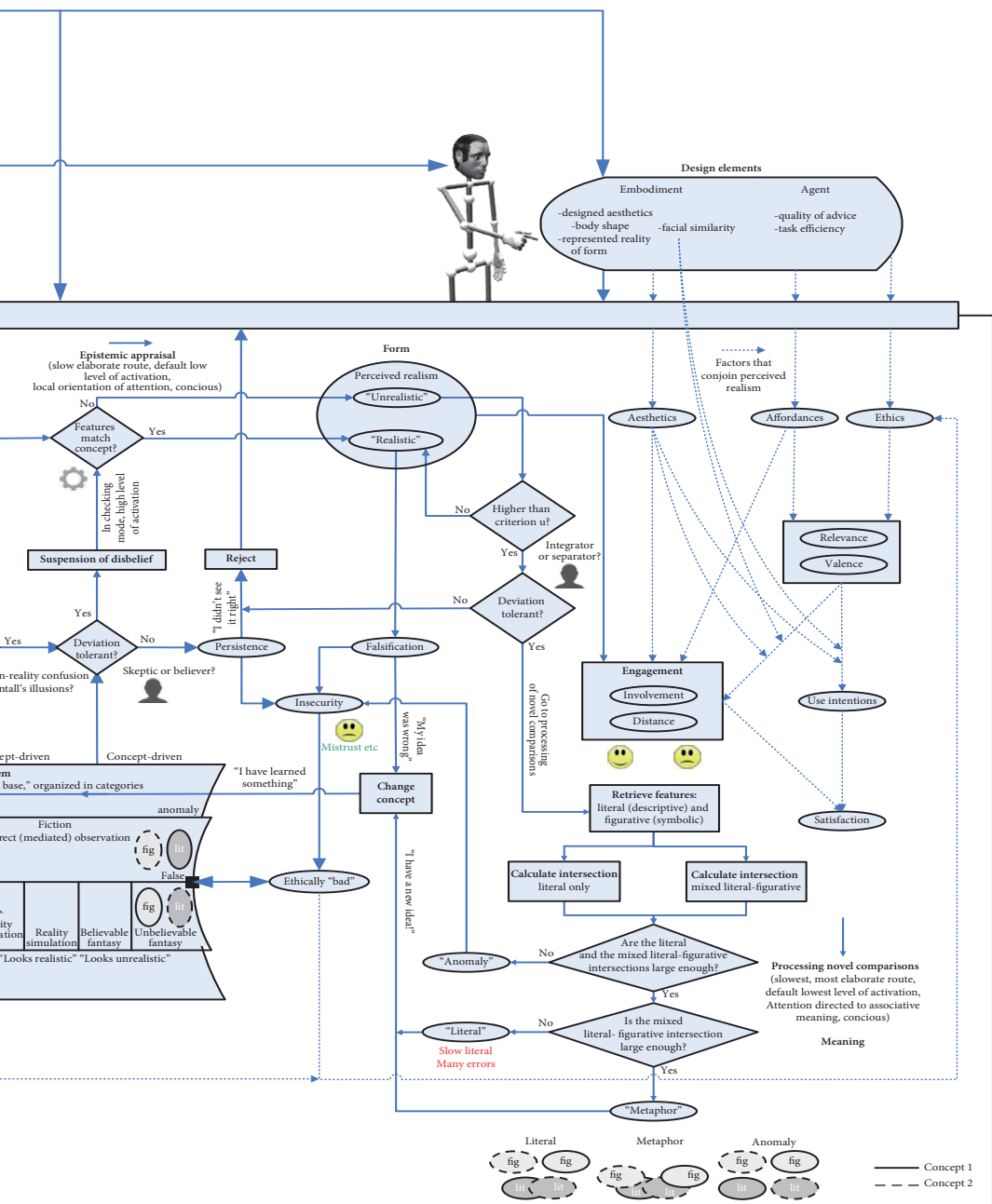


Figure 1. Epistemics of the Virtual.



it. For instance, the brain is the physical environment in which mental activity takes place. The physical world, then, is all that is concretely there and all that happens – irrespective of our being aware of it. You can think of events, situations, people, and objects.

Although it may be a counter-intuitive thought, in *Epistemics of the Virtual* the whole set of behavioral rules that we call culture is regarded as part of the physical world. Culture in this view is the concrete manifestation of mental activity. An idea that is verbally stated, drawn, carved, acted out, or written down can be seen as materialized mind and by definition is part of the physical world. Many creative ideas are written down but that does not readily make them part of a general culture. It takes authority in whatever form before a community will adopt an idea or behave in a certain way (cf. ‘field theory,’ Csíkszentmihályi, 1996, pp. 27–33). Therefore, culture is defined by a group of people who have formal or informal authority in, for example, religion, science, arts, design, technology, governance, business, education, upbringing, socialization, sports, law, or behavior (e.g., etiquette). They tell us what to do and think in various situations. If you want to change the cultural situation you are in, you should leave the group, attack the authorities, or become an authority yourself. After the change, all that remains is ‘old culture.’ In Figure 1, the upper left box shows that culture is set by authorities in various domains and that its concrete manifestations are part of the physical world.

Figure 1 illustrates that everything we encounter in the physical world, culture included, is input for the human sensory system (ears, eyes, fingers, etc.) and shapes our personal experiences. Through the sensory system, inputted data are sent to the brain and become information that the mind can work with. How this transformation takes place is a true scientific mystery. Data come in and in Figure 1, the big arrow leaving the **SENSORY INPUT** box has “Data-driven” next to it, indicating that data-driven processes take place, such as feature detection. However, the world is not viewed in a mindless way. All kinds of concepts, schemata, scripts, and (personal) biases are active to interpret the data with. This is concept-driven processing of information and four arrows that leave the **BELIEF SYSTEM** are meant as an illustration of this. The arrow that loops from the mental world into the **SENSORY INPUT** signifies mental activity as input to itself, indicating that our own thoughts can be input to our own mental world. In that case, the brain registers the information internally; a conscious observer of its own thoughts and feelings. How it does that, I do not know.

2. Ontological classification

2.1 When the world makes sense

Data come in and Figure 1 shows a configuration of big arrows that together form a process I have termed **ONTOLOGICAL CLASSIFICATION**. It is a process that goes on continuously. It is fast, automated, does not require a lot of attention, and happens almost unconsciously. It is the constant interplay between sensory input and verification by the belief system to monitor that data and concepts – what we believe about the data – are still in line. The central mechanism of ontological classification is an instance-category match. It is a mainly cognitive process (therefore, the cogwheel) that checks whether detected features (**DETECT FEATURES**) are globally congruent with the categorized concepts in the belief system.

The belief system is a store of concepts or ‘knowledge base.’ It categorizes ‘what I know and what I think I know’ on the basis of similarities and differences. Concepts and categories can follow strict Christian, Islam, or scientific formats or can be mixes (e.g., Catholic animism, the atheist Christian). The strong beliefs are considered either true or false and are hard to change. The weak are things held possible and are easier to change. For certain people and to some extent, weak beliefs (e.g., science) are allowed to be inconsistent with the strong (e.g., religion) because the weak ones are merely ‘possibilities.’

If someone observes another person, his or her general features are checked against the category of human beings. If there is a match (“yes, a nose, hair, is alive, and walks upright”), a state of confirmation is achieved that leads to accepting the observation (**ACCEPT**). The loop “sensory input – feature detection – instance-category match – confirmation and acceptance” is the most frequently applied routine we have. It is what happens all of the time while going through the world and looking around.

There are some positive side-effects to this quick-and-dirty procedure. The confirmation of beliefs nurtures a comforting state of security and reassurance which can be accompanied by positive experiences such as trust, hope, and credibility (illustrated by the happy emoticon). From early childhood on, we learned that what reassures us must be something with good intentions (e.g., the parent) and therefore, it is ethically good. In addition, what is ethically good and repeatedly confirmed by the aforementioned loop must be true (and vice versa). When the input comes in the form of a representation such as text (e.g., “the monkey is an animal”), speech, or a snapshot, the contents of the message are by default taken as literal (as in not metaphoric) and are not suspected of fictitious elements although epistemically there is no ground for such assumptions. Mediated information that is taken literally strengthens the chain reaction of what reassures us

is good and what is good must be true. Of course, all this is just a heuristic that is logically fallible but pragmatically we work with it every day. It strengthens us in our beliefs, it has a positive bias, we feel happy about it, and it makes us move ahead unworried.

2.2 All else is disturbance

When something does not match the way we classified the world in our belief system, the instance-category mismatch or incongruence with expectations evokes a surprise effect, which can be measured at the scalp as evoked potentials (e.g., P300, N400). It is accompanied by doubt, because more checks are needed to verify whether the concepts of the world are still correct. A second check is done to find out whether the right context was assumed or that the information should be interpreted otherwise. That actually presupposes that, by default, people declare the context of interpretation to be 'Reality' or 'background noise.' What we regard as reality is not the same as the physical world but is the mental representation of it. `DECLARE CONTEXT`, then, is a concept-driven setting to perceive the world with and can be installed by, for example, genre labels (e.g., "This is a meeting," "That is a game").

The mismatch between data and concepts urges to check whether the context should perhaps be 'Fiction.' Does the mismatch point at a signal? If someone walks in with a red plastic nose on his or her face, that nose does not match with the features of human beings. It makes perfect sense, however, if a fiction context is assumed: It matches the noses of clowns. Conversely, if a Fiction context is assumed (e.g., a play), adding Reality elements to it (e.g., the audience is allowed to interfere) may be just as surprising and confusing as the other way round. If 'Reality' is the context assumed, there do not need to be fictional aspects involved. The difficulty with fiction is that many elements from reality still remain active (signals are noisy). The person who plays the clown is still part of reality but pretending to be a clown, as indicated by the red nose, is fictional. This may lead to illusion and confusion, which can be explained by taking a signal-detection point of view.

If an instance-category mismatch occurs, the default context of 'Reality' may not be right. In that case, categories from the Fiction part of the belief system are retrieved to see whether the incoming information matches. Again, genre labels may help to avoid the confusion. When the context is declared 'Fiction,' the observation must be checked again for instances that match categories but this time they are the categories from the Fiction side of the belief system. The Reality-deviant feature may match with, for example, the Reality simulation cluster, Believable

fantasy cluster, or more fine-grained: romance, drama, horror, etc. If there is a match, the loop from sensory input to acceptance (that it is fiction) starts running, as well as the chain ‘confirmation – reassurance – goodness – truth.’ Here we come to the hard part: On a global or meta-level, the observation that the clown is fiction is true. “The clown is fiction” is a literal statement in Reality. On the local or feature level, however, the clown comes close to being false because the red nose is not a real one. But the fact that the red nose is not an intentional lie saves it from ethical ‘badness’ (Rule 3 of metamorphosis) and draws it back into that part of fiction that is closer to reality: It’s a joke. The statement that “The clown is fiction” brings in the reality element that an utter lie would avoid (Rule 2 of metamorphosis).

Can there be a literal statement within a fiction context? Yes, the red nose of the clown refers to what it is – a red nose. It does but partly refer to a real nose, that is what makes it fiction. However, it does not stand for something else than what it actually is. That is why its meaning is literal. As soon as the nose also stands for or refers to something else than plain denotation (e.g., representing clumsiness), it becomes a metaphor.

2.3 Coping with or embracing disturbance?

Suppose a feature comes in that fails to match any of the categories in the belief system (whether from Reality or Fiction) but that the context is clear (“I am in a meeting; therefore this must be Reality; I am looking at a circus act; therefore this must be Fiction”). Figure 1 shows that a more personality-oriented check is done whether you are open to deviations from the belief system or not. The silhouette of the person next to the decision diamond *DEVIATION TOLERANT?* asks: “Am I skeptic to my own convictions or am I a believer?” This of course has to do with the strength of the beliefs, a concept-driven aspect of the decision. A true believer has strong beliefs. Things are either true or false and category boundaries are clear-cut (in or out). These convictions are hard to change. A self-skeptic thinks in terms of possibilities and has weaker beliefs. Someone in a creative mode has to be self-skeptic to allow multiple perspectives to a problem (cf. Hoorn, in prep.). Categories are allowed to be tentative and fuzzy (features have partial membership functions). Self-skeptic and true believer differ in their personal settings on the truth continuum: The self-skeptic uses mid-scale values, whereas the believer uses the extremes. Most Fiction is not absolutely false (it is not necessarily a lie) but an ardent believer has difficulty in accepting it under Rule 3 because in his or her view, all fiction should be regarded as false. In Figure 1, then, the positioning of the Fiction segment on the truth continuum represents the self-skeptic’s point of view.

When the observer is by default convinced about his or her own beliefs (a strong believer), the answer to the question whether one is deviation tolerant is 'no.' In that case, the process of ONTOLOGICAL CLASSIFICATION continues with an effect of Persistence, insisting on the correctness of the preferred ideology and REJECTION of the observed sensory input ("I did not see it right" or "This is plainly false"). Everybody is a strong believer at times. When we come across false class-inclusion assertions such as 'the whale is a fish' or 'a spider is an insect,' we merely respond with "not true."

Yet, a believer who encountered concept-disturbing data can only keep the faith if there was initial (but suppressed) doubt. There is some fishiness to a whale. Spiders and insects are related. Therefore, some insecurity remains (as the counterpart of Reassurance), evoking negative experiences. The sad emoticon shows that mistrust, fear, and suspicion (or even self-condemnation) may accompany Insecurity. If something does not fit the belief system although the context is clear, a strong believer faces a dilemma that is solved in the following way: There is something unexpected. It seems to exist but I am not willing to change my beliefs. That induces insecurity, mistrust, and suspicion, which means that this oddity must be morally repulsive, therefore I reject. As the negative counterpart of the fallible heuristic that what reassures us is good and what is good must be true, the inference occurs that what makes us insecure is bad and what is bad must be false (and vice versa).

3. Epistemic appraisal

Someone who is more deviation tolerant enters a second phase of verification. In Figure 1 above, the big arrows indicate the process of ONTOLOGICAL CLASSIFICATION, whereas the thin arrows designate the elaborate process of EPISTEMIC APPRAISAL. Indeed, Epistemics of the Virtual is a dual-process model (Prentice & Gerrig, 1999) in which ONTOLOGICAL CLASSIFICATION can be regarded as the central route and EPISTEMIC APPRAISAL as the peripheral one. Another way to frame it is that the central route of ONTOLOGICAL CLASSIFICATION resembles the principle of *cognitive economy*. EPISTEMIC APPRAISAL as the elaborative route resembles the principle of *perceived world structure* (Rosch, 1999/1978, pp. 190–191) but then under conditions of uncertainty. Because it is elaborate, allows for more ambivalent and fuzzy categories, it takes more effort and is slower. By default (least effort principle), EPISTEMIC APPRAISAL is at a low activation level and serves as a monitor of the global ontological classification, focusing at the local feature level. It becomes more active as soon as the route of ONTOLOGICAL CLASSIFICATION is left and the attention is drawn to local features that do not fit in with the global

categories of the belief system (features become salient or foregrounded) and that the *self-skeptic* wants to (re)evaluate.

Epistemic appraisal is not for die-hard believers. People who do not right away reject mismatches with their beliefs and with the applicable context are willing to SUSPEND DISBELIEF and explore the FORM and perhaps the MEANING of the deviation. The main cognitive mechanism in ONTOLOGICAL CLASSIFICATION is the globally oriented instance-category match; in EPISTEMIC APPRAISAL it is a locally oriented feature match (see the second cogwheel in Figure 1). A deviant feature, which is temporarily tolerated through SUSPENSION OF DISBELIEF, is matched with what it should be conceptually (“That worm thing looks like a tongue”) or what it pretends to be (e.g., “An impersonation of Obama”) or what is stated that it is (e.g., “Julliet is the sun”).

For instance, the alligator snapping turtle (*Macrochelys temminckii*) uses its tongue as a lure to attract prey such as fish. The tongue is red, fleshy, and wriggles like a worm (Figure 2).

Figure 2. Alligator snapping turtle – tongue used as worm lure (a, b).



In the instance-category match, for non-turtle experts, the alligator snapping turtle has a distinctive feature – its tongue. The context is clearly Reality (wild life) but it is still weird to accept that a natural metamorphosis took place and that turtles have tongues like these and that they use it in this way. But I am tolerant to deviation because conceptually I know that many weird things exist in nature. So I bear with the snapping turtle and check whether the tongue is a real tongue and not actually a worm it is eating. I make a match between the features of this tongue and what I know turtle tongues look like. Many features overlap between this and other turtle tongues. For example, there is a turtle attached to the tongue and it is placed inside its mouth. However, the worm-like features do not completely overlap with the turtle tongues I know. Too red, too long and thin, too wriggly. In other words, the perceived realism (Figure 1) that the tongue of the turtle evokes has a realistic component, fed by the inputted features that match the concept of turtle tongues and an unrealistic component, fed by the tongue-deviant worm-like features.

If someone observes an object, the perceived features are weighted for importance and matched against the internal representation of features (coming from whatever domain) that the observer beliefs are real. The (weighted) sum of matching features, then, establishes the value for being realistic. The mismatches determine the value of being unrealistic. Together, the values for being realistic

and unrealistic form a measure for perceived realism. Thus, the reality as represented by the form of the stimulus (e.g., the snapping turtle's worm-like tongue) evokes two values, one for 'Realistic' (as an internal reflection of the background noise) and one for 'Unrealistic' (as an internal reflection of the signal). In its turn, perceived realism conjoins with factors such as ethics and aesthetics to build up engagement with fictional characters (i.e. tongue impersonating a worm) but this aspect will be discussed at the end of this chapter.

When the internal response is smaller than the criterion u for 'Unrealistic' ("This worm-thing still has something of a turtle's tongue") (Figure 1: Higher than criterion u ? no), this will increase the value for being realistic. If for all the deviant features the internal response does not go beyond criterion u , the judgment stays "Realistic" and then Falsification of the initial concept (e.g., of turtles) takes place ("Although this is not a typical turtle's tongue, I now see that this is also one, so I have to change my ideas about it and assume that in wildlife, such tongues are possible for turtles"). Thus, when a stimulus with deviant features makes a strong realistic impression, old concepts are falsified (as the opposite of confirmation), CHANGE OF CONCEPTS OCCURS, and the belief system is updated in the mid scale area of possibilities on the truth continuum – in the twilight zone between Reality and Fiction. This may be the case in conventional learning, where the pupil needs to adapt the belief system when the teacher tells that a whale is not a fish and that the sun is a star. Repetitive findings or teachings of the same phenomenon will push the newly learned or adapted concept towards 'true.' Else, it remains 'possible' or in the long run, when the impression decays, even 'false.'

Yet, falsification may be decided for cognitively, but is accompanied by insecurity, mistrust, fear, etc. – you only encountered it once or twice. This – with different levels of intensity – activates the chain reaction of what-makes-us-insecure-is-bad and what-is-bad-must-be-false (and vice versa) ("This cannot be true, scary turtle, the work of the devil").

If the internal response is greater than criterion u , then no falsification of old concepts takes place. We get back to another personality check and see whether the observer is still deviation tolerant enough to accept an abnormal form by looking for a deeper meaning. If someone does not accept a deviant form, that person will REJECT it ("It is not a tongue, because it is too worm-like"). No falsification of personal concepts takes place. If someone is in a more associative mode or a seeker of deeper meaning, the process of understanding novel comparisons starts.

The processing of novel comparisons starts under the condition that the observer has something of a "linker" or an integrator such as literary scholars or artists (Carveth, 1984). Those who are pure "separators" or analytics (ibid.) (see the human silhouette in Figure 1) probably have a hard time understanding creative ideas and reject new literal statements (e.g., breakthrough science) and

metaphoric input. Carveth stated that integrators (“linkers”) focus on perceiving similarity between concepts, whereas separators focus on dissimilarity. My interpretation of this idea was that pure integrators such as priests and artists want to merge (things are related) and pure logicians and analysts want to differentiate phenomena. Related to this, I offered a signal-detection analysis (cf. Bentall, 1990) of how two disparate concepts become novel combinations in the one mind but not in the other.

4. Processing novel comparisons

In the literature on metaphor, there are many competitive theories (see Gibbs, 2008). The view on metaphor advocated in this book emerges from a comparative empirical study between the comparison, anomaly, and interaction point of view. In my account, the already activated features of the two remote concepts that are supposedly related (e.g., “my tongue is a worm”) are enriched with associations (aspects, attributes, features) (RETRIEVE FEATURES). The perceiver starts associating because she needs the extra features to increase the possibilities that a meaning connection is established (more background noise is tolerated with the signal). Features can be symbols anchored in the culture (e.g., tongue stands for lust, worm for inferiority) or can be highly personal (“Reminds me of my dog”). In all, the information that is elicited has different qualities: Part of it consists of descriptive, lexical meanings (the literal sense of the metaphor) and part of symbolic, representational, or figurative meanings (cf. Henle, 1966, p. 174), which are already anchored in the culture or in personal life. In ‘love is a rose,’ for example, the literal aspect of the features of rose may be red, leafs, stem, thorn and the figurative aspect may be passion (red), offspring (leafs), lineage (stem), and heartache (thorn). Hoorn and Woestenburger (1997) and Hoorn (1997) provide extensive evidence for this position as well as for the description of how the process develops, which is discussed next.

Two sources of qualitatively different information are accumulated in parallel. The first is the overlap between literal aspects of the features of both concepts. In the case of ‘love is a rose,’ it may be that both are beautiful but fragile. The second source attempts to find and create meaning connections between the literal aspects of the one concept and figurative aspects of the other (the mixed literal-figurative intersection). Red is a literal, descriptive feature of roses but for love, this color is symbolic or figurative, denoting passion. What is used literally for the one concept is used figuratively for the other. For example, red may be a literal, descriptive, aspect of worm but may figuratively stand for lust with tongue. Through the color of red, the worm is connected to the lust of the tongue.

Then a series of checks commences to determine the semantic status of the new combination of concepts. According to subjective criterion placement, it is checked whether the literal intersection as well as the mixed literal-figurative intersection are large enough. If not, the suggested relation between the concepts must be nonsensical, an anomaly, because insufficient connections can be established on the literal and the literal-figurative plane. The relation between the concepts is meaningless. The distance between the normal distributions for the probability of internal responses, then, is so large that they do not overlap and the decision is to reject.

If the two intersections do exceed criterion, the second check is to see whether the peculiar combination of concepts (there was an initial instance-category mismatch), after deep thinking and in hindsight, may still be regarded as literal. When Maxwell stated that electromagnetic fields are gear boxes (Introduction), he did not intend figurative meaning. He merely said that if you combine two unrelated domains, literal aspects of the one domain (circling vortex) behave as if they were literal aspects of the other (wheels and pulleys) (cf. A. I. Miller, 2000, p. 221). For the perceiver, such a novel comparison has a fictional aspect (the *as if*) but it is not a metaphor: It is a novel literal statement about the world (a new hypothesis, a new invention).

Thus, if enough literal overlap is found but not enough literal-figurative overlap, the combination of concepts is judged as 'literal.' This is a less clear-cut decision than the one for 'literal' following an instance-category match. There is more uncertainty but the final verdict is still that a possible signal for figurativeness was drowned by noise. Process times will be slower and more mistakes are made. It is to capture through elaboration those 'true' statements one is unacquainted with (cf. a scientific paradigm shift) and that otherwise may have been overlooked.

If there is a large enough literal and literal-figurative intersection, a signal is detected, and it is decided that the novel combination of concepts is a metaphor. In part, a decision for metaphor is based on 'evidence from the absurd,' it is the one option that remains after it is clear that something is not literally meant but not nonsensical either. Note then that there is a difference between novel and conventional metaphor. Conventional metaphor ('He fought like a lion') is treated as a familiar literal expression ('He fought hard') and only becomes a metaphor after reactivating the original imagery. Novel metaphors are conceptual combinations never encountered before and are processed as described. Also note that 'my tongue is a worm' is not a metaphor from an animal point of view. As a human perceiver we can interpret it that way. In nature, there may be form similarity, which instigates perceived realism, but only humans may intend similarity in meaning as well. Without meaning similarity, the turtle's tongue is a false metamorphosis expressed as an impersonation under Rule 2 (the turtle as an imposter).

Below the decision for ‘metaphor,’ at the bottom of Figure 1, you find the distinctive way in which meaning of novel literal, metaphoric, and anomalous communication is formed. In each case, there are four feature sets involved. Feature sets are fuzzy, indicating that features may contribute to the literal meaning of the communication (red is a color) as well as to the figurative meaning (red stands for lust). There are also at least two concepts involved that are presented as having some sort of meaning relation. In literal communication, the intersection between Concept 1 (drawn) and Concept 2 (dashed) is established preeminently through literal, descriptive, features (dark gray ellipses). The figurative intersection (light gray) remains empty.

Metaphors make the most meaning connections, moreover, between different sorts of information. Literal features of the one concept overlap with figurative, symbolic, features of the other concept. Yet, a connection to ‘Reality’ is still guaranteed because there is purely literal overlap as well (it should not be too bizarre). An anomaly does not have any meaning connection among the four feature sets. A metaphor, therefore, has the richest meaning but is also less precise; metaphors exclude fewer possibilities. They have use for a poetic state of mind whereas literal statements are better fit for creating new hypotheses.

Figure 1 shows that metaphors, anomalies, and literal communications are fed back into the BELIEF SYSTEM but this is not without doubt. After all, there was an initial instance-category mismatch and in the cases of novel literal communications and metaphor, the belief system needs to be adapted. Therefore, new literal hypotheses may be judged as possible and tending towards truth but they are ‘not true yet.’ In the absence of evidence, they remain fiction. Anomalies go into the opposite direction. Nonsense and lies feed the feeling of insecurity, which is ethically ‘bad’ and therefore must be ‘false.’ Metaphors enter the realm of possibilities just like novel literal comparisons but more to the side of Fiction. Metaphors connect literal features with figurative ones. Therefore, metaphors meander between what is fiction but could possibly be reality and what is probably reality but perhaps might be fictitious. Figure 1 depicts the butterfly of metaphor (Chapter 3), fluttering between the realms of reality and fiction with fertilizing virtuality.

5. Perceived realism as part of the overall experience

Epistemic appraisal is the designated tool for the attribution of truth after the ontological classification has been disrupted. Its main output is a measure of perceived realism (Figure 1) that is based on how realistic or unrealistic something looks. Perceived realism relates to form similarity with what we regard as Reality.

However, for the overall experience of virtual people, perceived realism is just one of the factors that count and not always the most important.

5.1 Fictional characters

5.1.1 *In film, literature, and theater*

In Figure 1, we take up where we left at establishing a measure of realism to see how it adds to character engagement. Perceiving and Experiencing Fictional Characters (PEFiC) was originally developed to understand engagement with characters depicted in literature, theater, and film (Hoorn & Konijn, 2003). At the basis lie three factors on which a character is encoded: ethics, aesthetics, and epistemics (later called perceived realism). The encode phase basically answers three questions: Good or bad guy, beautiful or ugly, realistic rendition or not? After the encoding, a comparison between the character's features and those of the self takes place to establish a level of similarity ('Is s/he like me?'), relevance ('Is s/he important to me?'), and valence ('Should s/he win or lose?'). These six factors shape the response of ENGAGEMENT with the character, which is expressed as a level of involvement ('I love him/her') *in parallel to and not excluding* a level of distance ('I hate him/her'). The balance between involvement and distance, then, determines how much appreciation or liking the character has raised in the observer. Two extensive empirical studies, one on film characters (Konijn & Hoorn, 2005) and one on media figures (Konijn & Bushman, 2007), confirmed that all nine PEFiC factors were necessary and sufficient to explain the statistical variance in the data.

5.1.2 *In computer interfaces*

Because literature, film and theater are unidirectional, I-PEFiC is the Interactive variant of the Perceiving and Experiencing Fictional Characters (PEFiC) framework. In the upper right corner of Figure 1, a wire-frame character with a realistic head points at a flowchart display-shape called DESIGN ELEMENTS. It is a kinesthetic skeleton that serves as a humanoid widget in a computer interface and forms an example of what is widely known as embodied agents. The word 'agent' in computer science should be understood as a piece of software that can act on behalf of the user and thus should be capable of making independent decisions. The main difference with characters in movies and books is that users can interact with the interface character. People are not just watching; they partake in the action.

The DESIGN ELEMENTS of the embodied agent are part of the physical world. They are responsible for signal strength. It is what individuals see on the display screen and the interaction they experience while working. It has a graphic form

or appearance side (Embodiment) and a content or functional side (Agent). In a series of empirical studies that scrutinized I-PEFiC, we singled out four features in the embodiment and two functional features that trigger the experience of a fictional character one can interact with (Van Vugt et al., 2006; 2007, 2008, 2009, 2010). With regard to its appearance, these features are the aesthetics designed into the character, body shape, the represented reality of its form, and its facial similarity with the user. Functional features that affect the user's experience are the quality of the advice the character gives and how efficient it is in performing tasks or helping to do so.

One big arrow leaves the DESIGN ELEMENTS to enter the SENSORY INPUT. This is to emphasize that embodied agents and other fictional characters also go through ONTOLOGICAL CLASSIFICATION before they enter EPISTEMIC APPRAISAL. This leads to a measure of Perceived realism. Realism, however, is not solely responsible for establishing engagement with a fictional character. People judge characters for their Aesthetics (beautiful or ugly), Ethics (good or bad) as well as for the Affordances (aid or obstacle) they see in a character (i.e. an agent) for achieving users' goals.

All kinds of direct and indirect effects occur during the interaction between user and agent but the most important ones do not come from Perceived realism or Aesthetics but from the Affordances and Ethics: Function over form seems to be the user's preference. In fact, Perceived realism is the least important (Van Vugt et al., 2007). Users foremostly want to know whether they can trust the agent (Ethics) ("Is it a cover-up of malicious software or not?") (cf. Zillmann & Bryant, 1975; M. Smith, 1995, p. 85) and in how far they think the agent is useful as a tool (Affordances). The trust and confidence users put in a fictional character come out of the ONTOLOGICAL CLASSIFICATION of the agent, in which ethical goodness is associated with truth and badness with falsity (see the arrow entering Ethics from the right). The association between ethics and truth probably lies in the good or bad intentions designed into or perceived in the character and in how far the character reveals these intentions (truth) or covers them up (false). Good intentions that are unveiled and bad intentions that remain hidden lead to straightforward reactions (trust and mistrust, respectively). Mixed feelings arise from good intentions that are never told (the silent benefactor) and bad intentions made explicit ("A crook, but at least he is honest about it").

Users then estimate how important it is for achieving their goals (e.g., to get advice, to be entertained) that the agent is good, bad, an aid or an obstacle. In Figure 1, this is expressed as the Relevance of the character to user goals. Relevance interacts with Valence, indicating in how far the user has positive or negative expectations about the character in achieving those user goals. The agent may be useless for getting advice (obstacle) but be entertaining because it is so grumpy

(bad attitude). Thus, Ethics and Affordances determine Use intentions (“Do I want to use it or better lose it?”) through the mediation of Relevance and Valence (“Is it really important to me and what do I expect from it?”). Use intentions, then, help to establish a level of Satisfaction with the agent in combination with how far users feel engaged with the character. ENGAGEMENT is a matter or simultaneously experiencing love and hate in various degrees and forms, captured by the measures of Involvement and Distance, respectively. Satisfaction with a fictional character is a function of Involvement and Distance in unison with, as said, Intentions to Use the character as a tool.

Note that Perceived realism does not affect Use intentions whatsoever. Thus, no matter how realistic people may think that a creation looks, it does not make them want to use it. Both Perceived realism and Aesthetics do affect the level of Involvement and Distance but they do so without checking user goals. Relevance and Valence are skipped, although Aesthetics can moderate the effect of Relevance and Valence on ENGAGEMENT, making the effect a little higher or lower (Figure 1, first arched arrow from the left). Aesthetics can do the same for the effect of Relevance and Valence on Use intentions, increasing or decreasing its impact (Figure 1, second arched arrow from the left). This suggests that Perceived realism and Aesthetics may be affective pleasers and teasers but do not touch upon major user concerns. They may be nice to have and may add to the flavor but they are not strict necessities. Perceived realism and Aesthetics turn out to be typical form or appearance factors, which may be used to indicate the functionality behind them (e.g., good intentions, valuable qualities) but also to fake that functionality (e.g., looks good but turns out unreliable).

Next we get to a number of cross-over effects. Affordances appear to have two sides. One aspect touches upon users’ goals and concerns and is evaluated for being a useful tool or not. Yet, Affordances also have an appearance side, directly affecting ENGAGEMENT without checking their importance or expected utility. That is, cool gadgets that the agent carries make people love the character right away and uncool things put them off no matter how useful the tools may be. Ethics never has an appearance side and is the ‘deepest’ and ‘most earnest’ of them all – as it is related to trust and truth. The Ethical side of a fictional character such as an embodied agent is *always* checked for users’ goals and concerns before it can excite some Involvement and Distance, indicating that an agent may make a mess as a tool as long as it does not do it on purpose.

Finally, we get to the mystery factor of facial similarity between a character and its observer. In earlier work (Hoorn & Konijn, 2003), we thought that similarity would strongly determine the ENGAGEMENT process – see the identification theory that posed that the more someone becomes one with the character (= similar), the stronger the experience would be (cf. Oatley, 1995). Yet, in our

work with 3D generated avatars of real users (Van Vugt et al., 2010), people only subconsciously reacted to facial similarity and with indirect results. Perhaps the unconscious effects of facial similarity as a design feature came close to perceiving the aesthetics of an agent because the effects were similar: Like Aesthetics, facial Similarity can make the effect of Relevance and Valence on *ENGAGEMENT* higher or lower (Figure 1, third arched arrow from the left) and moderate the effect of Relevance and Valence on Use intentions (Figure 1, fourth arched arrow from the left).

In sum, the role of Perceived realism is not dominant in engagement and satisfaction with fictional characters. Ethics, however, regarded as the moral implication of telling the truth is the strongest predictor of Involvement, Distance, and Use intentions and through these of Satisfaction. To a lesser extent Affordances do the same. In other words, Ethics also has effect on willingness to use and Affordances also on feeling friendly or not. May it be so then that the handyman or a colleague is not only a friend because he is a good person but also because he does things for you? And no matter how hard someone works for you, if you don't consider him or her a good person, s/he will never be your friend? Interactive characters have the potential to evoke stronger engagement than non-interactive characters. Interactive characters may not only be good, beautiful, realistic people but also useful to achieve or obstruct personal goals, which adds to the feeling of being involved or not.

5.2 Personification: Fictional character and metaphor in one

In Figure 1, Epistemics of the Virtual splits at the exit of Perceived realism, where you can go from form and outer appearance to explore multiple and deeper layers of meaning by searching for metaphors or where you could explore the experiential side of media exposure (i.e. fictional characters) until a level of satisfaction is reached. Yet, these things can also occur in parallel and this is where fictional characters and metaphors unify in the form of personifications. Figure 1 shows that processing the character can commence immediately, whereas the metaphor process takes longer to reach (through *EPISTEMIC APPRAISAL*) and may never commence (e.g., if someone is not deviation tolerant).

6. Epistemics of the Virtual implemented in a robot

From a robot's perspective, all its hardware and software belong to what it regards as reality. However, its mental world and affective personality it knows are fictitious. So how will a robot attach truth to what it thinks if what it thinks belongs to

the realm of possibilities and falsity? This is another version of the liar paradox: If a fictional character thinks, are its thoughts then fictitious as well or can it speak the truth? As explained in the Introduction of this book, that the thoughts are fictitious do not make them meaningless. The chess computer Deep Blue may think that it can play chess better than the grandmasters so it may assume that it approaches truth when it discusses chess moves. If robots are not real people but can speak the truth, then as a person, the robot is fictitious, but not as a robot.

What if robots and autonomous agents have a mind of their own and not only that, what if they treat us as illusions and not as something real in their own world? The liar paradox would reverse. Robots, for example, could decide that their fellow machines such as Deep Blue have more perceived robot realism and speak more truth than their human users. Humans are known for their mistakes and lies and computers for their exact output. The usual inputs to robot systems are user behavior measures such as click logs, actions in the interface, or video registrations. Are these messages 'mediated,' according to robot epistemics, or are they robot's direct observations? What would happen if we directly connect the human brain to a robot using a so called brain-computer interface (BCI) and the exchange of information would be online? Would the robot regard our thoughts as mediated messages such as camera recordings or would it regard our brain waves as observations of its own? That would herald an era of *the virtuality of epistemics*.

Take – Make

Epistemics of the Virtual is the first of two books about creativity and fiction. From the assumption that all makers were takers at first and that perception precedes fiction while fiction precedes creation, *Epistemics of the Virtual* is a treatise on the way humans understand, perceive, experience, and deal with fiction in an increasingly mediated and virtualized world. It covers important topics of fiction-reality confusion and truth telling in a way that many readers will find both engaging and illuminating, drawing on biology, psychology, philosophy, communication, literary theory, and computer science. There is more scholarship in this book than in most of what passes for cognitive scholarship today. It puts forth both theoretical constructs and empirical findings on matters such as the attribution of truth, ontology, epistemics, perceived realism, fiction versus reality, metamorphosis, impersonation, metaphor. It does so for theater, virtual reality, literature, film, Internet, fine arts, magical thinking, insanity, robots, animal behavior, animated agents, and the illusions of everyday life.

Epistemics of the Virtual strikes at common beliefs of what fiction is, putting scientific models on a par with soap stories and disclaiming that non-fiction exists. Yet, it is neither relativistic nor idealistic about truth but makes it an indivisible part of moral judgment and clarifies that claims to truth are the result of authority syllogisms. It argues that credibility is hardly related to correctness of information. It questions traditional ideas on genre, on the classifications in astronomy and biology. It argues that the Large Hadron Collider near Geneva is an incredibly expensive machine for rendering inconclusive results (they're looking for a unicorn). It shows that acts of virtuality are not unique to humans and do not need intellectual sophistication to be effective: Plants can do it too. *Epistemics of the Virtual* challenges our common understanding of personal identity; it explains why disputes of lying in fiction are silly and fought for the wrong reasons, why it is possible to steal things that only exist virtually, that the misunderstanding of natural metamorphosis or shape-shifting paved the way for metaphor understanding, that hard-nosed scientists are closer to orthodox believers than artists, and that artists have poorer stimulus discrimination than scientists have. The book ends on the suggestion that robots may find our world view virtual as compared to their mental representations of robot reality.

All these ideas and arguments are then summarized by a grand scheme, a final chart, that explains the relations and dependencies between culture, belief system, ontological classifications, epistemic appraisals, confirmation, falsification, moral judgment, individual sensitivities and tolerance, the liking of virtual characters, and interpreting metaphors. That chart is *Epistemics of the Virtual* in its capacity of a gateway to formal modeling, computer simulation, and empirical validation of how people think they know what they hold for real or not. On how they take things. The next book is on how they make things.

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October 10, 2010
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In being the managing director of the Center for Advanced Media Research Amsterdam (CAMErA) at the VU University Amsterdam, senior associate professor Johan F. Hoorn works in an intensively multidisciplinary and international research environment. Johan holds two PhD degrees, one in literature and one in computer science. Most of his work is cognitively oriented with a focus on creative technologies such as virtual characters, emotionally intelligent agents, and AI robots. Published papers range from author identification, virtual reality, genre rules, and metaphor to user studies, requirements engineering, and software architecture. He has a US patent pending regarding a user tracking system that utilizes Wii technology. Johan is the leading coordinator of the VU University's activities in the creative industries and one of the founders of THNK, the Amsterdam top school of creative leadership and entrepreneurship. Recently, he was granted a fellowship by the Lorentz Center of the Royal Dutch Academy of Arts and Sciences (KNAW) to develop a unified theory of creativity at the Netherlands Institute for Advanced Study in the Humanities and Social Sciences (NIAS).

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