

Artifice System Handbook

A guide to designing deceptive action



NATIONAL
CYBER
DECEPTION
LABORATORY

artifice
www.artifice.co.uk

Artifice System Handbook

A guide to designing deceptive action

Simon Henderson, Artifice Ltd

**Visit www.artifice.co.uk
to see our programme of professional courses**

Release Notes The enclosed materials are released subject to the following conditions:

1. Under no circumstances may these materials be reproduced without the written permission of the Copyright holders.
2. Copyright for all published material is held by Artifice Ltd unless specifically stated otherwise. For further information about copyright and obtaining permissions please contact: enquiries@artifice.co.uk
3. Artifice Ltd have endeavoured to trace the copyright holders of all images. If we have unwittingly infringed copyright, we will be pleased, on being satisfied as to the owner's title, to cease using the image or to pay an appropriate fee.
4. The materials herein are provided for educational and professional workshop purposes only; Artifice Ltd will not be held liable for any action taken, or any failure to act, in reliance on the information contained in this document outside of classroom or workshop environments.

Table of contents

Foreword	v
Laying the foundation	1
Introduction	1
Defining key terms	5
The goal of deception - Planned Behaviour Change	8
Secrets, revelations and surprises	11
Once deception has been discovered, can it be repeated?	11
The principles of deception	12
The four curses of the influence and deception planner	13
An overview of the Artifice System	14
Summary	15
6BM - A Six Block Model of deception	17
Introduction	17
A generic, transportable and scalable model of deception	18
6BM: Attention	21
6BM: Perception	28
6BM: Sensemaking	30
6BM: Expectations	33
6BM: Emotions	35
6BM: Behaviour	37
6BM: The Real World	39
A note on deception and culture	40
Applications of the 6BM	42
The 6BM Universal Question Set	43
Using the 6BM for understanding interpersonal deceptive communication	45
Summary	46
Deception Gambits and Influence Strategies	49
Introduction	49
What are gambits?	49
Two types of building block	50
The Gambit Table	50
Gambit Cards	52
Function of the gambits	53
Using the gambits	53
Influence Strategies	54
Sneaky Thinking	56
Orson's Third Option	56
The Princess Bride Principle	57
Summary	59

Target Audience Analysis for deception (TAA)	61
Introduction	61
How much understanding about a target is required to deceive them?	61
The structure of the 6BM-TAA question set	62
Using the 6BM-TAA	64
Individual or group targets?	64
Targeting	65
Summary	66
Behaviour change	69
Influence and deception applied to wicked problems	69
The problem of non-specific operational goals	70
Analysing the mission tasking to specify behaviour change goals	72
Time, cost, people and other resources	74
Common characteristics of successful planned social change	75
The three burdens of influence and deception in a professional context	76
Summary	77
The Deception 7 Questions (D7Q) planning approach	79
Introduction	79
What is planning?	79
Philosophy of the D7Q	80
Ideation	80
The structure of the D7Q	83
How should the D7Q be used?	84
Coupling ideation and the D7Q	84
The communication of deceptive intent	86
Written deception communication strategies	88
Verbal deception communication strategies	88
Summary	89
MOE – Measurement of Deceptive Effect	91
Introduction	91
Cause and effect	91
Mapping cause and effect onto the 6BM	93
Operationalisation of non-specific planning language	94
Operationalisation of influence and deception goals	95
Monitoring measures for execution feedback	97
Outcome measures and organisational learning	97
Summary	97
D-Check – green lights, red flags, risks and ethics	99
Introduction	99
Green flags - The necessity for using deception	99
Red flags – conditions that prompt questioning of the use of deception	100
Risks in employing deception	101
The D-Check checklist	103
The ethics of deception	103
Summary	104

Deception analytics	107
Introduction	107
The Deception Ladder and Deception Ladder Template	107
Analysing a case of deception using the Deception Ladder Template	109
Representing deception using the Deception Ladder Template	110
Coding and representing Deception Gambits	110
Quantitative analysis of multiple historical deception cases	112
Representing the temporal dimensions of deception	112
Some challenges to conducting Deception Analytics	114
Deception Ladder applications	114
Summary	117
D-TECH - Deception and Technology	119
Introduction	119
Can software deceive?	119
Does cyberspace enable new types of deception?	123
The Big Data opportunity chain	125
Applying the 6BM to target software	127
Summary	128
CODECCA – Counter-deception	131
Introduction	131
Jones’s Principle	132
Adopting an Active Stance	133
Employing hyperacuity	134
Listening to intuition	135
Detecting anomalies	135
The Counter-Deception Critiquing Approach (CODECCA)	137
Beware false anomalies	137
Responses to the detection of deception	138
The deception/counter-deception arms race	140
Summary	140
Real-time improvisational deception	143
Introduction	143
The keys to improvisational deception	143
Summary	149
CPD – Continuing Professional Development for deception practitioners	151
Introduction	151
Developing your influence and deception skills	151
Summary	152
In conclusion	154
Handbook summary	154
Post-note	154
A compendium of the Artifice Deception Principles	156
Maxim’s maxims	156
Henderson’s deception principles	158
Bibliography	162
Acknowledgements	169

Foreword

This handbook is intended to help practitioners that have a professional requirement to fool others to be more effective in their jobs. Used in conjunction with the Artifice course programme, the handbook seeks to empower its readers to become better at 'deceptive thinking', enabling them to out-think, intellectually out-gun, and out-manoeuve their targets in highly adversarial settings. It represents thinking accumulated over the course of nearly fifteen years of research into the fundamental nature of deception, many years spent supporting deception practitioners across a range of organisations, and a lifelong passion for magic, confidence tricks, and other means for deceiving.

The handbook is deliberately light on theory, and heavy on practice. It is intended to provide a practical means for designing deceptive action that works. For those readers that do want more of the background, the handbook also supplies many references to other work that explains more about how deception works, and the methods used for fooling others in many other domains of application.

The principles and processes described in the handbook transcend domain, application, and hierarchy. This means that the methods can be applied to the design of any form of deceptive action, to fool any type of target (from individual to organisation) within any domain of application. These methods can be used by anybody that needs to design any form of deception - from undercover police officers, military planners, intelligence staffs, advertisers and marketers, fiction writers, theatre designers, magicians, etc., and also by counter-deception practitioners, including police officers, intelligence staff, security personnel, cyber defence staff, customs and anti-smuggling staff, store owners, anti-fraud personnel, etc.

A key consideration in writing a book about deception is the potential use to which these ideas may be put. The book therefore addresses as a primary concern the ethics of deception, illustrating some of the many benevolent applications of deception. It also discusses the means by which deception can be detected and defeated (this topic will be addressed in more detail in a later handbook) together with the means by which the principles in this handbook can be used in a 'poacher turned gamekeeper' mode to support counter-deception. Finally, this handbook provides tools that can help practitioners to develop their deceptive thinking skills throughout their careers.

Simon Henderson
March 2019

**“To be human
is to cheat
and be cheated.”**

Bell and Whaley (1982)

Laying the foundation

Introduction

Deception is all around us. It exists at all levels of life, from the microbial to the global-geopolitical, and it confers an evolutionary advantage to both predator and prey. In the short term, deception increases gain, or minimises loss. In the longer-term it confers evolutionary advantage by increasing the chances of survival, maturation and reproduction. Deception is hard-wired into each and every one of us. It can be used benevolently to do wonderful good, as well as malevolently to do incredible harm. Effective deceptive action often has a simplicity, elegance and an almost aesthetic quality of beauty to it. Yet at the same time, by its very nature, deception is not obvious, it is surprising, and the means by which it works is often extremely counter-intuitive. These characteristics can make deception difficult to study, understand and enact.

The intracellular parasitic protozoa *Leishmania* (sometimes referred to as a ‘flesh-eating disease’) uses multiple forms of deception to survive and reproduce. Initially, dead parasites expose a molecule that supports the entry of live parasites into cells, thereby evading the host’s immune responses and avoiding detection. Once the parasite has entered a host cell, it releases a molecule that prevents the cell from responding to an ‘aging trigger’ molecule, thereby increasing the cell’s lifespan so that it can complete its lifecycle (Cecalio, Perez-Cabezas, Santarem, Maciel, Rodrigues, & Cordeiro da Silva, 2014; Knodler, Celli, & Finlay, 2001).

A wide variety of different plant-based deception occurs, including the use of scent mimicry to attract and predate on insects, such as the western skunk cabbage that mimics the scent of a skunk to attract insects (Broderbauer, Diaz, & Weber, 2012). Visual mimicry can be used to simulate a sexually attractive insect, such as the bee orchid that attracts other insects to mate and facilitate pollination (Jersakova, Johnson, & Kindlmann, 2006; Paulus, 2006; Scopece, Musacchio, Widmer, & Cozzolino, 2007; Streinzer, Ellis, Paulus, & Spaethe, 2010; Streinzer, Paulus, & Spaethe, 2009; Vereecken, 2009). And as a defensive measure, some benign plants mimic other plants that are poisonous or sting, including the dead nettle which resembles a real nettle to deter predators from attacking or eating it (Lev-Yadun, 2016; Schaffner, 1910).

Deception is widespread in the animal kingdom, and can be seen across all phyla. Deception may be visual, including various forms of camouflage or mimicry, such as a bird that displays a simulated broken wing to lure a predator away from its ground-nestling chicks (Hiller, 1989). Some animals, such as drongos use false alarm calls to scare other species away from food that they then steal (Flower, Gribble, & Ridley, 2014). And shortly before they become highly vulnerable as a result of moulting, Mantis Shrimps will physically threaten other Mantis Shrimps to

establish a reputation for aggression, which they then capitalise on by maintaining bluff threat displays before their exoskeletons have hardened (Adams & Caldwell, 1990).

In humans, children learn to lie at an early age (Evans & Lee, 2013; Sinclair, 1996). However, the transition from being a poor liar to a better liar reflects development of the capacity for imagining the world from another person's (i.e. the target's) perspective, a process known as 'theory of mind'. This phase of development marks a key stage in a child's acquisition of higher-level cognitive reasoning skills (Ding, Wellman, Wang, Fu, & Lee, 2015; Spence, Hunter, Farrow, Green, Leung, Hughes, & Ganesan, 2004). Studies have also shown a positive link in young children's ability to deceive, and their subsequent academic development (Evans & Lee, 2011; Lee & Ross, 1997) and a related relationship between deceptive ability and brain size has also been identified in primates (Byrne & Corp, 2004).

There exists a significant industry built around the purported (if scientifically questionable) ability to detect lying in humans, often linked to a range of claimed enabling technologies, from the polygraph (which uses heart-rate analysis, galvanic skin response, respiration patterns, and other analysis), micro-gesture detection and analysis, speech pattern analysis, through to functional magnetic resonance imaging (Ekman, 1985; National Research Council Committee to Review the Scientific Evidence on the Polygraph, 2003).

Deception enables the practice of social engineering, in which a fragment of information obtained about an organisation (for example, the name of an employee) is used to manipulate employees within that company in an iterative and escalatory cycle to gain increasing levels of information, privilege and access (Long, 2008; Mitnick & Simon, 2002).

Deception similarly facilitates many different forms of scam and confidence trick, in which a mark's confidence and trust is first gained, and then exploited by a swindler, usually resulting in a loss of money or goods (Lovell, 1996; Stajano & Wilson, 2009).

Deception permeates advertising and marketing, giving rise to phenomena such as brand mimicry, misleading packaging and labelling, advertising that targets children in the form of free online games (known as 'advergames') and apparent low-budget parody adverts produced as tributes by a product's fans, that in fact have been commissioned from large marketing firms - a genre of advertising known as 'sub-viral' (Boush, Friestad, & Wright, 2009; Shrum, Liu, Nespoli, & Lowrey, 2012).

Deception exists in sport, both as an inherent and legitimate tactic (e.g. a boxer throwing a feint, or trick plays that utilises mimicry and misdirection such as the

‘Statue of Liberty’ play in American Football) and also in the form of cheating, such as covert doping or manipulation of equipment (Morris, 2013; Pfleeger & Roeseberg, 2013).

Within the psychic industry, books teach manipulative linguistic strategies that enable a purported psychic to pass on messages that are so personal and so accurate that they can only (apparently) have been passed-on directly from a dead relative (Hyman, 1977; Rowland, 2008).

The field of magic and conjuring exploits deception to fool audiences for entertainment, and while there are limits to the generalisability of magic, magicians are one of the few classes of deceiver that actively document their methods, and magic books contain a wealth of information about how people are fooled (Lamont & Wiseman, 2005; Macknik, Martinez-Conde, & Blakeslee, 2011).

Deception enables many different forms of cheating in the context of gambling, from physical and psychological moves designed to misdirect a croupier from an exchange of low-value chips for high-value chips during a game of roulette, to reprogramming a casino’s gaming computer to erroneously print winning pay-out slips (BBC, 2010; Marcus, 2005; Ortiz, 1984). Deception is also used within gambling as an acknowledged and legitimate tactic, such as the use of bluffing in poker (Palomäki, Yan, & Laakasuo, 2016).

There exists an extremely long and rich history of deception as a military strategy, to enable surprise, simulate increased force size, and confuse the enemy as to real capabilities or intentions (Tzu, 500 B.C.; Whaley, 2007).

Deception occurs in music, where a listener’s expectations about the progression of a chord sequence may be deliberately set-up, and then unexpectedly violated using an irregular resolution to create surprise and interest (a dominant to superdominant chord progression known as a ‘deceptive cadence’) (Foote & Spalding, 1905, pp. 68-69).

The world of art employs deception to surprise, delight, frustrate, confront and confound observers and participants. *Trompe-l’œil* (French for “deceive the eye”) employs photo-realistic optical illusions to fool viewers into believing momentarily that they are viewing real three-dimensional objects, such as a door or a window painted onto a wall, or a figure in a painting that appears to extend beyond the painting’s frame (Kubovy & Tyler). Performance artists may also stage events such as pranks, protests or other forms of public or corporate intervention, without the unwitting participants involved being aware as to the real identity of the artist, or that they themselves are participating in a work of art (Reeves-Evison, 2016). And deception is rife in art fraud, in which the works of great artists are painstakingly and accurately falsified with the intent to fool expert authenticators, auctioneers and bidders (Hebborn, 2004).

The authors of works of fiction often deliberately manipulate and deceive their readers. Storylines plant explicit or implicit clues designed to shape the reader's sensemaking and expectations as to whodunit, only to confound these with the sudden twist at the story's conclusion as to who really did it (Shipley, 1953).

Special effects designers employ deception to create false but convincing visual representations of real world or imaginary activities that are too expensive, too risky, or too technically prohibitive to do for real. And realistic special effects capabilities are also enabling other deceptive activities, such as hiding a perpetrator's real identity during a bank robbery (Sanders, Ueda, Minemoto, Noyes, Yoshikawa, & Jenkins, 2017).

And as cyberspace and cyber conflict continues to develop apace, new capabilities and new forms of deception are emerging that rely on the ability to create, manipulate and exploit behavioural residue, exploit anonymity, automation and permutation, and achieve global reach and massive asymmetry. Such capabilities have given rise to exotic terminology including 'astroturfing' (the creation of artificial grass roots support), 'sock-puppeting' (the creation of one or more online personas to engineer false dialogue) and 'googlewashing' (changing the apparent meaning or significance of a search term by pushing specific results up the rank ordering and causing the original results to appear lower-down in the ranking). See Lee (2010); Livingston (2005); Orłowski (2003); Solorio, Hasan, and Mizan (2013); Stajano and Wilson (2009); Zibreg (2013).

From this long list of domains one can begin to appreciate the vast range of applications in which deception is practiced to fool a target and create some kind of advantage for the deceiver. And it is worth bearing in mind that the domains discussed here barely begin to scratch the surface of the totality of settings in which deception is utilised. But what links these examples together? What are the common threads? How can one begin to relate the deceptive mechanisms used by Leishmania to the deceptive strategies used in sockpuppeting? How can deception as practiced on the sports field help us make better sense of deception when it is used to cheat at the roulette table? And how can the study of deception within these domains assist a practitioner that needs to deceive others in an entirely unrelated domain?

An important foundation for answering these questions is to first define our terms!

Defining key terms

The Oxford Dictionary of English (Oxford English Dictionary, 2016) defines deception as:

“[To] deliberately cause (someone) to believe something that is not true, especially for personal gain.”

This definition, which is typical of those derived from dictionaries, falls short in several respects. First, it implies that truth or falsehood is a binary either-or state, and does not, for example, address varying degrees of truth, or the case in which parts of a situation are true, while other parts are false. Second, the definition does not cater for situations in which one wishes a target to not believe a situation that is true; the definition therefore fails to cater for situations in which reality is being hidden or actors are operating covertly. Third, it is entirely feasible to deceive a target without telling any lies whatsoever, indeed the truth itself can be structured and presented to deceive (a process sometimes referred to as ‘paltering’).

Other definitions fair somewhat better. For example, current UK deception doctrine, JDP 3-80.1 (DCDC, 2007) defines deception as:

“Deliberate measures that manipulate the perceptions and condition the behaviour of the adversary, in order to achieve and exploit an advantage.”

While this definition introduces psychological processes and their manipulation (perception, behaviour, manipulation and conditioning) close inspection reveals that it is not specific to deception; indeed, it could just as well be a definition for ‘influence’.

Another common component of definitions of deception is that the action of the target is often specified as being prejudicial to their interests. For example, the US Department of Defense Dictionary of Military and Associated Terms (Staff, 2007) defines deception as:

“Those measures designed to mislead the enemy by manipulation, distortion, or falsification of evidence to induce the enemy to react in a manner prejudicial to the enemy’s interests.”

While this definition is recognisably military and adversarial in nature, it does not constitute an adequate basis for a definition of deception in general, as there are many instances in which deception is used for benevolent purposes that are not prejudicial to the target’s interests. For example, a medicine may be flavoured to fool a patient’s sense of taste into finding it palatable, in order that he can ingest it to receive its benefits.

A new definition is hereby proposed, a definition that seeks to address these concerns, and sets the notion of deception against a more contemporary psychological foundation (Henderson, 2011):

Deception:

“Deliberate measures to induce erroneous sensemaking and subsequent behaviour within a target audience, to achieve and exploit an advantage.”

A key component of this definition relates to the notion of ‘erroneous sensemaking’; that is, some aspect of the target’s understanding of the world is deliberately led to be wrong, or in error. It is this focus on error that differentiates deception from other related concepts, such as influence, persuasion or coercion, etc., and indeed influence more broadly. The notion of sensemaking will be addressed later in the paper, as a fundamental building block of deception. Figure 1 unpacks this definition and explains its different components.

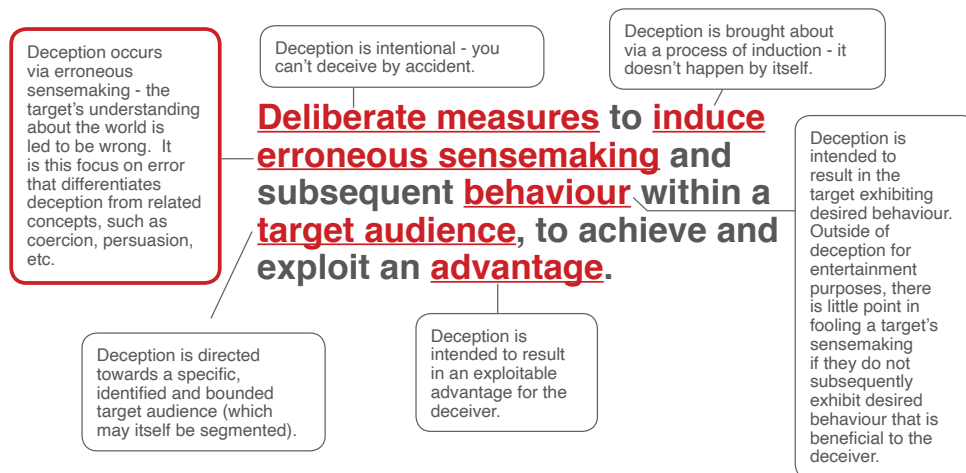


Figure 1 - Unpacking the definition of 'Deception'

This definition differentiates deception from influence via the inclusion of erroneous sensemaking. Turning to a definition of influence:

Influence:

“Deliberate measures to induce desired sensemaking and subsequent behaviour within a target audience, to achieve and exploit an advantage.”

Note difference between ‘desired sensemaking’ here, versus ‘erroneous sensemaking’ in the definition of deception. The definition of influence is similarly unpacked in Figure 2.



* This definition refers to influence that is conceptualised and executed as a deliberative strategy for bringing about desired behaviour change in a target audience. Note also that influence *may* arise unintentionally, and result in outcomes that are disadvantageous. Such issues should be addressed as part of the risk management process.

Figure 2 - Unpacking the definition of 'Influence'

Deception is therefore a class of influence, as depicted in Figure 3.



Figure 3 - Deception is a class of influence

Both involve influencing a target to engage in desired behaviour, however, deception is characterised specifically by its generation of desired behaviour through the induction of erroneous sensemaking. Influencing a target does not require that its understanding of the world is wrong. For example, a target may be incentivised to change its behaviour by receiving a payment. In this case, the target has been influenced to change its behaviour through correctly making sense of the reward offered, and no deception is involved.

The Influence-Deception Principle

All deception involves influence, but not all influence involves deception.

The notion of a 'target audience' has also been introduced in both of these definitions. The term 'target' and 'target audience' are used synonymously throughout this handbook, although 'target' is generally preferred for brevity.

A target is:

The actor(s), or system(s) that constitute the aim of an influence or deception activity, within which behaviour change is sought.

An influence or deception target may comprise an individual, a group, an organisation, a segment of a larger populous, and potentially even higher levels of human collective, such as a state. A target may also comprise any system that exhibits some form of behaviour, and within which behaviour change may be sought, such as a computer system, algorithm, etc. An approach to conducting Target Audience Analysis (TAA) is presented in 'Target Audience Analysis for deception' on page 61.

The goal of deception - Planned Behaviour Change

"Indiana Jones plays no role in the outcome of the story. If he weren't in the film, it would turn-out exactly the same."

Amy, The Big Bang Theory, Season 7, Episode 4, 'The Raiders of Minimization'

Deception seeks to change future outcomes to the benefit of the deceiver. Specifically, deception is directed towards changing a target's behaviour to the deceiver's advantage.

Behaviour comprises:

Any activity that can be seen by an external observer.

Desired behaviour change may involve wanting the target to:

1. Stop their current behaviour.
2. Start a new behaviour.
3. Switch from their current behaviour to a different new behaviour.
4. Continue a current behaviour they would otherwise stop or change (i.e. to conduct 'business as usual').
5. Not start a new behaviour that they otherwise would.
6. Speed-up a current behaviour.
7. Slow-down a current behaviour.

The focus and necessity for deception to bring-about behaviour change within a target is captured in the ‘Indiana Jones Principle’, relation to the quotation above:

The Indiana Jones Principle

Deception should change the future. If there is no behavioural change in the target resulting from their erroneous sensemaking, the same outcome could and would have been achieved by the deceiver doing nothing.

The necessity to focus on changing the target’s behaviour to the deceiver’s advantage is also reflected in the ‘Camilla Principle’, named after a hard-won lesson learned by Dudley Clarke in 1940, from his planning and subsequent execution of Operation Camilla:

“In the first deception plan I ever tackled I learned a lesson of inestimable value. The scene was Abyssinia... General Wavell wanted the Italians to think he was about to attack them from the south in order to draw-off forces from those opposing him on the northern flank. The deception went well enough - but the results were just the opposite of what Wavell wanted. The Italians drew back in the South, and sent what they could spare from there to reinforce the North, which was of course the true British objective. After that it became a creed in ‘A’ Force to ask a General ‘What do you want the enemy to do?’ And never ‘What do you want him to think?’ It was surprising how difficult they often found it to produce an answer.”

Clarke, D. (1972). Some Personal Reflections on the Practice of Deception in the Mediterranean Theatre from 1941 to 1945. In: Master of Deception, David Mure (Editor). London: William Kimber. p. 273-275.

The Camilla Principle

Always focus on what you want the target to do, not just what you want the target to think.

In many domains the deceiver’s behaviour change goal for the target may be quite straightforward. For example, in military deception, the goal may be to get the enemy to move their forces to one location while you attack in another. In a cyber phishing attack, the goal could be to get the target to click on a link that will result in malware (software that compromises the integrity of a computer system) being installed on their device. And in sport, the goal might be to fool the opposing team into deploying their defenders to defend against the empty-handed person that is pretending to carry the ball, while the real ball carrier crosses the goal line unopposed.

In other domains, the deceiver’s behaviour change goal for the target may be more subtle. On first consideration it may not be obvious as to a magician’s

desired behaviour change in an audience member that is watching them perform a magic effect? Similarly, what behaviour change is desired when a person heading out for a date uses concealer makeup to cover up their acne? One might also ask what behavioural change is desired by a painter that seeks to fool his audience through his use of trompe l'oeil (an illusory artistic technique designed to fool the observer into perceiving painted features as existing in three dimensions - such as the 1446 work 'Portrait of a Carthusian' by early Netherlandish painter Petrus Christus, that includes a lifelike representation of a fly, replete with shadow, that appears to be sitting on the inner edge of the painting's frame)? In each of these cases it is worth thinking about what the target's immediate and longer-term behaviour would have been had the deception failed. The spectator at the magic show may not have applauded, would probably not have told others about the amazing show he was at (indeed, he probably would have told others how bad the show was if it didn't fool him), and he would probably not go to see the magician again next time they were in town. The other person on the date (especially if they are overly concerned with their prospective partner's appearance) may have been less attracted to their date, could inadvertently have stared at their acne and made them self-conscious and lose confidence, they may have flirted less with them, and (when combined with their date's loss of confidence) developed less rapport, and as a result they may have decided not to see each other again. And for the spectator who viewed Christus's painting, had they failed to spot (and then realised the falsehood of) the fly sitting on the frame, they may not have experienced that inner moment of delight, they may not have excitedly told others about this moment of personal discovery, and they may not have been inclined to keep an eye-out for other works or exhibitions by the same artist. They may also have decided not to purchase this particular work of art. In all of these cases, successful deception has changed the future behaviour of the target.

In some circumstances the deceiver may wish the target to engage in behaviours that are not based on erroneous sensemaking, but that nevertheless lead to erroneous sensemaking and subsequent behaviour change that benefits the deceiver. For example, while at the roulette table a deceiver may wish to exploit her partner's pre-planned and exceptionally well-timed sneeze to misdirect the croupier's and other player's attention, and in that moment place their chips on the winning number after the ball has landed (an illegal move known as 'past-posting'). The sneeze changes the behaviour of the croupier by momentarily attracting their attention towards the sneezer; the croupier's behaviour has therefore changed, but this change is not the result of erroneous sensemaking. At this stage, the croupier has also not yet been fooled. It is only as a result of the croupier not noticing the deceiver's illegal placement of the chips that occurs a fraction of a second after the sneeze, and therefore believing that the chips

have been placed legitimately, that they erroneously pay-out the winnings to the deceiver. The croupier's erroneous sensemaking therefore results in a change to their behaviour, and this behaviour benefits the deceiver. Such issues regarding causality are address in the section 'Measures of Effect' on page 91.

Secrets, revelations and surprises

"One should not suspect, let alone detect [the use of deception]."

S.W. Erdnase, The Expert at the Card Table (Erdnase, 1902)

This principle applies to a wide variety of deception in which even the target's suspicion regards the mere possibility of deception could prove disastrous to the deceiver, such as in under-cover police operations, intelligence work, cheating in a casino, etc. However, in other domains, this idea does not necessarily apply. In the example cited earlier of Christus's fly, the deceiver obtained benefit as a result of the discovery of the deception by the spectator. If the spectator had seen the fly but not realised that it was false, the deceiver would most likely not have gained the advantage resulting from the deception being discovered.

In some cases, the use of deception will always necessarily involve a reveal. When a magician performs a magic effect, there is always some kind of reveal of an impossible outcome, that lets the spectator know that they have been deceived. In many types of military deception (for example, fooling the enemy as to the timing or location of an attack) once the real activity occurs, the deception is revealed and the target becomes aware that they have been fooled. In both of these instances, the revelation of the deception creates surprise. When the target is not aware that deception is present or has occurred, they are not surprised.

In some circumstances, the deceiver can only gain advantage if they remain covert and the deception is never discovered; in other circumstances, the deceiver can only gain benefit if the target realises they have been fooled. And in some forms of deception, there is no option but to reveal the deception to the target via the process of gaining advantage.

Once deception has been discovered, can it be repeated?

Revelation of the use of deception to the target may result in the following problems for the deceiver: a loss of initiative, revelation of a covert capability, creating an expectation of future use of deception in the target, inducing paranoia and suspicion. However, just because the target knows that you have used deception to fool them previously, does not mean that you cannot use deception against the same target again.

Good deception will include a range of methods for divorcing method from effect. This means that the target will know that they have been fooled, but will not know how they were fooled. Moreover, the deceiver can also plant false clues that will lead the target to conclude that a different method has been used to achieve the effect. Even if the target knows exactly how they were fooled, this creates a set of expectations that can be exploited, for example by changing-up the method through which the same effect is achieved next time. In addition, real activity can be portrayed as deceptive activity, exploiting and apparently confirming the target's suspicions (an activity known as 'reverse deception').

The Reuse Principle

Revelation of the use of deception to the target does not preclude its future use. However, good deception will always build-in the capability to deceive the same target again in the future.

The principles of deception

In studying deception across a wide variety of different domains, such as those cited at the start of this section, it becomes apparent that there are several common, recurrent and emergent properties of deception that transcend domain and application:

- All humans, irrespective of age, gender or culture, rely on the same core psychological processes to make sense of the world and generate action. These processes include: attention, perception, sensemaking, expectation, emotion and behaviour. All are prone to error, and to deliberate manipulation.
- Common strategies for manipulating these processes can be observed occurring across different domains of practice.
- Both the psychological processes identified, and the strategies employed to manipulate them, are scalable, and their application can be observed at all levels from individual, to group, to organisation (and, potentially at higher levels still).

From this foundation, seven generic, transportable (across domains), and scalable principles have been identified that provide a foundation both for understanding how deception works, and for designing effective deceptive action:

1. Deception is achieved through the presentation, placement and concealment of temporally anchored perceptual cue sequences that, via pattern recognition, influence the process of sensemaking.
2. Cues enabling deception can occur across sensory forms and may be physical or derived from communications channels.

3. A range of cognitive, emotive, social, and environmental events and properties can be manipulated to shape, constrain, truncate or disrupt a target's pattern matching process to enable deception.
4. Expectations are central to belief. Careful building, reinforcement, satisfaction and violation of the target's expectancies can be used to influence erroneous belief formulation and development.
5. Deception is more successful if it includes some form of emotional stress or arousal, which can induce time pressure and interfere with reasoning.
6. Principles 1-5 apply not just to individuals, but also to groups.
7. Deception is ethically value-neutral, and the same processes that enable deception can be used for malevolent or benevolent purposes. It is therefore the intent behind the deception, the purpose to which deception is put, the process that is enacted, and the outcome arising from the use of deception that must be subject to careful ethical scrutiny and evaluation.

These principles provide the foundation for a systematic approach to designing deceptive action designed to fool others.

The four curses of the influence and deception planner

All influence and deception practitioners are subject to a range of 'deception curses' that have been identified over the past 10 years of conducting deception research and working with deception practitioners. Such curses are virtually inescapable, and are likely to interfere with the conceptualisation and planning of deception action when they inevitably arise. The four curses are:

1. **The Curse of Naivety.** "It'll never work" - the inability of somebody who is not familiar and experienced with the psychological basis of deception to understand how deception works, and what it can achieve.
2. **The Curse of Secret Knowledge.** "They'll never fall for it" - once you know how a deceptive technique works you can no longer experience the 'wonder' of seeing it from a naive position - you thus become dismissive of its power (even if you yourself have been fooled by the technique).
3. **The Curse of Knowledge.** "You get why this works, right?" - an inability to communicate successfully a deceptive idea to someone because you cannot re-experience their position of ignorance and take this context into account within your explanation.
4. **The Curse of Guilty Knowledge.** "I'm holding a perfectly innocent box" - the interference of real time doubt in the successful enactment of the deception; often accompanied by over-compensation and the telegraphing of such doubt to the target.

Whilst one or more of these curses will always be present in any deception planning activity, the curses can be mitigated against using a structure approach to deception planning. This approach is known as 'The Artifice System'.

An overview of the Artifice System

A general sequence for designing deceptive action is:

1. Analyse and operationalise your mission goal, and determine the desired target behaviour change (Behaviour Change).
2. Identify how you will assess whether the deception has worked (Measurement of Effect).
3. Conduct target audience analysis to identify vulnerabilities that can be exploited to bring about behaviour change (Target Audience Analysis).
4. Establish whether deception is a necessary, legal, proportionate, and ethical means for achieving your goals (Deception Check).
5. Plan your deceptive action (Deception Seven Questions, Deception Gambits, Influence Strategies).
6. Map your deceptive plan (Deception Analytics) and establish how you will explain and communicate your deceptive intent to others.
7. Execute the plan (Real Time)

Before working through each of these processes in more detail, it is first necessary to discuss the most fundamental Artifice System component, on which all other components depend – The Six Block Model, addressed in the next chapter.

Summary

Deception is all around us. It exists at all levels of life, from the microbial to the geopolitical, and it confers an evolutionary advantage to both predator and prey. It is defined as: “Deliberate measures to induce erroneous sensemaking and subsequent behaviour within a target audience, to achieve and exploit an advantage.” Deception is a class of influence, and therefore, all deception involves influencing, but not all influence involves deceiving.

Deception seeks to change future outcomes to the benefit of the deceiver. Specifically, deception is directed towards changing a target’s behaviour to the deceiver’s advantage. If the target’s behaviour does not change as a result of their erroneous sensemaking, the same outcome could and would have been achieved by the deceiver doing nothing.

**“There’s nothing
so practical as
good theory.”**

**Kurt Lewin, one of the founding fathers
of social psychology.**

6BM - A Six Block Model of deception

Introduction

In 2012 a new species of spider of the genus *Cyclosa* was discovered that uses debris from captured prey to construct a larger simulacrum of itself on its web; and in common with the species *Cyclosa tremula*, the spider vibrates its body to shake the web, thereby causing the simulacrum to move (in some senses, this may be viewed as a form of puppetry) (Drake, 2012; Torres, 2012). In March 1862 Confederate General Joseph E. Johnston placed logs that had been painted black to resemble canon in his field works around Centreville, Virginia, to give the appearance that the works were still occupied while his men were actually withdrawing to the Rappahannock River in the face of a forthcoming enemy attack (Mills & Mills, 2008, p. 108). Drug dealers regularly cut their products with cheaper materials to bulk-up the expensive chemicals involved, seeking to use cutting agents that mimic the look, texture and taste of the drug they are selling (Cole, Jones, McVeigh, Kicman, Syed, & Bellis, 2010; The Telegraph, 2016). And in 2009, the hacking group 4Chan developed automated voting software to bypass voter authentication processes, and automate the voting process so that their founder became Time Person of the Year. In addition, they also gamed the order of the first 21 individuals listed in the poll, so that the first letter of their first names spelt out the message “marblecake, also the game” – a reference to one of their online discussion fora (Lamere, 2009).

At first glance it is not clear what the link is between a spider that puppeteers a facsimile of its own likeness, a US Confederate General employing trees to defend his position, a drug dealer cutting cocaine with benzocaine, and a hacking group using automation to vote online for its leader to be Time Person of the Year. On closer inspection, a set of common recurring features emerge from across these examples. In all cases, the deceiver attempts to inflate their size or presence using materials that are cheaper than, but simulate credibly the real thing. The first two cases are defensive applications of this approach, the latter two are offensive. In spite of these connections not being obvious, once a common and domain-independent language and descriptive framework exists for explaining deception, the recurrent generic structures and strategies become clearer. For our purposes, this lingua franca is the Six Block Model.

The Six Block Model provides a lingua franca for deception. It enables deception across all domains, target types and levels, to be discussed, analysed, planned and countered using a single framework and associated lexicon.

A generic, transportable and scalable model of deception

As has been described by many psychologists and philosophers (James, 1890), the fundamental processes of attention, perception, reasoning, and emotion are all highly interactive. But from this set of interactions one can form both descriptive models of the sequences of cognitive events in some past episode of deception, and prescriptive models of a process sequence to be followed to facilitate future deceptive activity. A generic sequence model is presented in Figure 4. The framework comprises a simplified representation of six core psychological processes that all humans, irrespective of culture, use to make sense of the world and generate action. In this sense, the framework is not specific to the study of deception; however, it provides a useful and actionable structure for both explaining and designing deceptive action.

The 6BM is not specific to the study of deception and can be used to support analysis and consideration of any human activity, and to support any form of behaviour change activity.

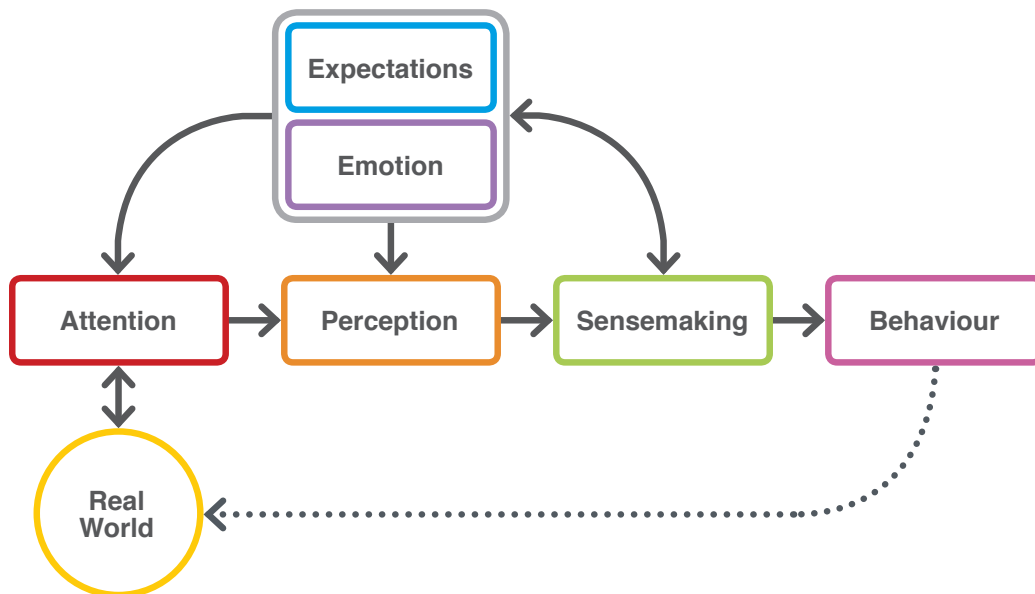


Figure 4 - Six-Block Model Deception Framework

The framework has the following features:

- In reality, all processes operate simultaneously in one complex and aggregate activity for making sense of the world and generating action (colloquially, ‘thinking’). Everything is connected to everything else, and there is no real notion of ‘flow’ as portrayed. However, separation of the processes into distinct elements, as depicted, helps inform retrospective causal-chain analysis and

description of deceptive events; and also provides the basis for a loose prescriptive sequence of steps for designing prospective deceptive activity. In this sense, the 6BM constitutes a ‘convenient fiction’ – while it is not true, it has significant generative utility and provides a firm foundation for the conceptualisation of deception.

“In one word, to draw the rule from experience, one must generalize; this is a necessity that imposes itself on the most circumspect observer.”

Henri Poincaré, The Value of Science: Essential Writings of Henri Poincare

- For the purposes of retrospective and prospective analysis, the processes are portrayed here as interdependent. Attention steers perception, perception feeds sensemaking, sensemaking generates expectations and emotions (that in turn shape other processes) and sensemaking also drives behaviour.
- Each process can be targeted and influenced independently to achieve different kinds of effect on the target’s thinking and behaviour. However, influencing interdependent processes is contingent on influencing proceeding processes (i.e. later processes can only be influenced by controlling the earlier processes that impact on them – for example, a target’s sensemaking can only be influenced by first controlling the target’s attention, and then shaping its perception).

These building blocks are scalable - that is, each individual psychological process has an analogue that exists at group and organisational levels. The strategies used for manipulating the psychological building blocks are the same, irrespective of the level at which they are applied. Figure 5, below, shows how each building block scales to an organisational level.

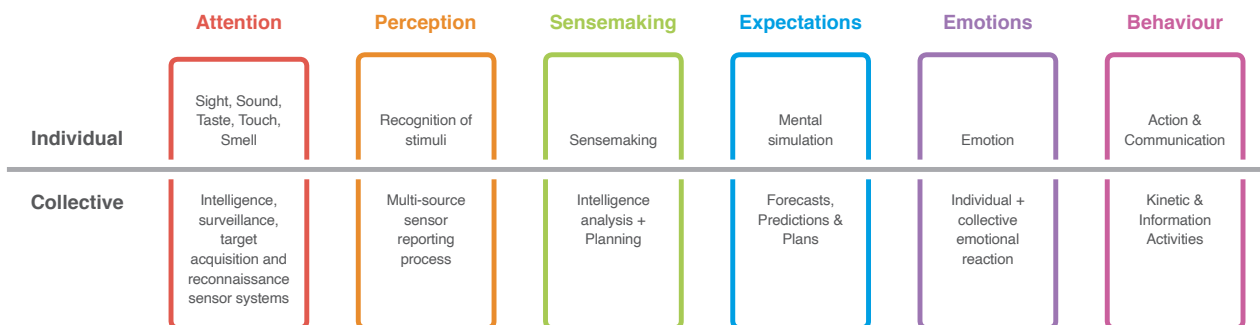


Figure 5 - How the psychological building blocks scale

Applications of the Six Block Model

The 6BM can:

- Be used to help structure thinking systematically about different kinds of influence and deception, and the effects they achieve (deception analytics).
- Provide a structure for analysing a target and discovering opportunities for influencing and deceiving them (target audience analysis).
- Support the representation and analysis of retrospective or prospective cases of deceptive action (deception analytics).
- Provide a structure for working through a series of considerations that underpin the design (and planning) of influence or deception activity.
- Provide an index to help sort different strategies that can be incorporated into a plan for fooling a target (gambits).
- Support the measurement of the effectiveness of your influence or deception course of action (measurement of effect).
- Support a counter-deception critiquing process that aids the detection of deception used by an adversary against us (counter-deception).

Each of the building blocks will now be considered in turn.

6BM: Attention

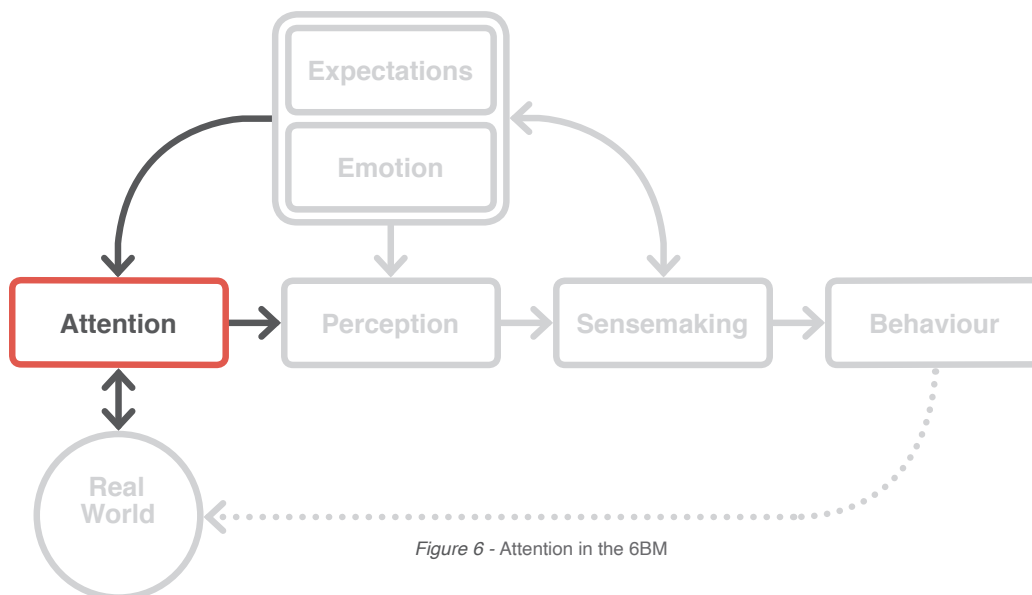


Figure 6 - Attention in the 6BM

Where should I point my sensors?

To deceive a target, it is first necessary to control their attention. If they are not attending to the signals you are sending or planting, or if they are attending to signals you do not want them to attend to, the target is unlikely to be fooled. Attention is the process of determining what features in the world we point our sensor systems towards (or 'where we shine the spotlight'). An individual's sensor systems include their eyes, ears, nose, tongue and skin, etc. An organisation's sensors comprise the assets it uses to collect information about the world (for a military organisation, its Intelligence, Surveillance, Target Acquisition and Reconnaissance, or ISTAR resources). Allocation of attention is determined via two separate processes:

- Attracted attention** (also known as 'bottom-up' attention). Our sensors are drawn towards any stimulus in the real world that exhibits conspicuity, that is, the property of being noticeable. Conspicuity is determined by a variety of factors including: intensity, size, movement, contrast, position, novelty, repetition, and absence. To attract a target's sensors, these characteristics can be amplified; to reduce or avoid a target's attention, these characteristics can be attenuated. Note also that these characteristics can also be applied to the properties of information. For example, if a deceiver wishes the target to attend to particular parts of the contents of an email (i.e. not components

such as any inherent images, fonts, colours, etc.) then conspicuity factors such as contrast could include a sentence that is very different from the sentences around it and therefore stands-out, a sentence that includes swearing or other impassioned emotional content, and therefore reflects intensity, etc.

- **Directed attention** (also known as ‘top-down’ attention). Put simply, we orient our sensors where we expect something interesting will occur. Our expectations about the future are formed based on mental simulation. At an organisational level, expectations are also formed based on more formal processes, such as forecasting, predicting and planning, and the results of these activities inform where the organisation directs its collection capabilities. Attention is also directed on the basis of saliency, in simple terms, we notice things that are at the forefront of our mind. For example, if we are thinking about buying a new car, we will tend to notice and attend to all the models of the same car that we pass while driving.

Strategies for shaping a target’s attention include:

- **Attract** – via the amplification of conspicuity to arrest a target’s sensors. For example, an angler fish uses movement of a simulated worm on its head to attract the attention of its prey; flowers use scent to attract the attention of bees.
- **Avoid** – via the attenuation of conspicuous characteristics (and via strategies such as masking or repackaging - see ‘Perception’, below). For example, military snipers wear ghillie suits (textured and camouflaged clothing that resembles grass) so that they do not stand out in contrast to their surroundings. Strategies for reducing conspicuity are shown in Figure 7.
- **Divide** – by creating alternative competing sources of conspicuity, thus reducing the attention that can be paid to any individual source. For example, during the Cuban Missile Crisis, the Russians unloaded equipment at eleven different ports simultaneously, thereby dividing American surveillance efforts (“Soviet Deception in The Cuban Missile Crisis,”).
- **Misdirect** – via seduction of the target’s sensors away from one source of conspicuity through the presentation of an alternative, stronger source of conspicuity. Note that the term ‘misdirection’ is something of a misnomer, as all misdirection comprises the direction of a target’s attention. For example, a pickpocket firmly squeezes his ‘mark’ on the shoulder while asking him a question, to direct the mark’s attention towards this area and away from having his trouser pocket ‘dipped’. The term misdirection also covers a range of other strategies beyond spatial direction of attention (i.e. where you look) and pages 34-36 present a range of different types of misdirection. The term

can also be applied to any activity conducted to prevent a target from understanding how an effect was achieved.

- **Plant** – information that we wish a target to attend to can also be planted in advance in locations where it is known the target will look in the future. For example, it may be possible to prompt a target's awareness of an information gap in their understanding, thereby leading them to search for the missing information in the location where it has been placed. By proactively searching for and discovering the information rather than having been fed it directly, a target will be more inclined to believe in its veracity.

Principles for attenuating conspicuity

Make object's or action's properties less intense

Consider as many properties of the object or action as possible.

For each conspicuous property, seek to make it weaker, less significant, or less noticeable; or find ways to blend the property with other properties, or into the background.

Ensure congruence and logic of position

Think carefully about where an object is located or where action takes place.

Does it make sense regards both its (real and apparent) form and function?

Is the object or action congruent with the environment and the other objects or actions around it? Do they make sense when taken together?

Ensure typicality and plausibility of size

The object or action should appear to be of 'normal' size, shape and dimensions.

It should therefore appear to be fairly typical example of such an object or action.

If the object or action is more conspicuous because of increased size, then its size should still appear to lie within plausible bounds.

Minimise movement

A general rule for minimising conspicuity is to keep movement to a minimum, as movement is highly conspicuous and will usually draw a target's attention. When movement is required, seek to coincide its occurrence with lapses in the target's vigilance. Alternatively, seek to hide the movement within a larger non-suspicious movement.

Reduce contrast

Consider how the object or action relates to its location and its background. Seek to minimise the differences.

Consider all the object's or action's properties, and in particular study the differences, boundaries and transitions between these properties and the object's or action's location and background (e.g. how an object stands or sits on the ground or on other objects; its edges; its colour, etc.; or how an action transitions between phases).

Minimise novelty

Seek to make the object or action look as uniform, regular and plain as possible.

It should appear 'plain' and 'boring'.

In this respect, an object or action should not appear to be perfect or new and should exhibit appropriate signs of aging, wear and weathering. Similarly, an action should be mundane, routine and expected.

Manipulate repetition

Seek to minimise the number of exposures that the target has to the object or action, as repeated exposure will make the object or action more conspicuous (due to recognition).

However, repeated exposures will also desensitise the target to the object or action, and eventually they will pay it less attention.

Justify the absence of conspicuity

Lack of naturally occurring conspicuity can, itself, prove conspicuous. When there is an absence of natural conspicuity, seek to either fill in or simulate the missing conspicuity; or make the reasons for such absence clear, obvious and logical to an observer (such that they have no need to seek an explanation).

Forms of misdirection

Spatial

Where the target looks.

The goal of spatial misdirection is to get the target to look in a particular attention, typically to take their attention away from another location.

Example: Pointing to an object.

Temporal

When the target looks.

Temporal misdirection involves affecting when the target looks at a particular location. Typically, temporal misdirection is synchronised with the occurrence of an activity that you do not want the target to attend to.

Example: Creating visual noise in one location to take attention away from another source of visual noise.

Focal

How the target looks.

Focal misdirection involves affecting how the target looks. This may involve affecting the choice of sensor systems they deploy, how that sensor is used, or how that sensor is focussed.

Example: Forcing the target to focus on a near object so that they cannot focus on a far object.

Perceptual

What the target attends to, doesn't attend to, attention blindness and perceptual hallucination.

Various different forms of perceptual manipulation can affect what the target attends to (or doesn't) in their environment. For example, different forms of visual illusion can render objects invisible (for example, through blending). targets can also be led to attend to things that are not physically present in the environment (for example, through the use of psychological suggestion).

Example: Miming the presence of an object so that the target looks in this direction (and possibly perceives the object as being present).

In-Transit Action

The big move covers the little move.

In-Transit Action involves hiding the occurrence of one action within another more conspicuous action. The smaller action goes unnoticed as the target's attention is focussed on the larger action.

Example: *Creating lots of noise and activity around an object so that its removal is not detected by the target.*

Social

We look where other people look.

Human attentional systems are hard-wired to respond to social cues. We subconsciously pick up on where other people are directing their sensors, infer that there must be something interesting happening there, and so point our own sensors in the same direction (we want to find-out what they're interested so in).

Example: *Having a crowd congregating in one location and apparently reacting to an event in order to lead a target to similarly attend to this location.*

Linguistic

Referential, mislabelling, miscalling, re-framing.

The communication we receive affects our mental model of the world, which in turn affects what we notice and attend to.

Example: *Labelling your activity one thing, while actually performing another.*

Memory

Attention in the past.

When we recall an event, we do not start at the end and work backwards in time. Rather, we pick a point in the past, and play the event forward. The point at which an event is recalled can be affected through the use of conspicuity, framing and suggestion.

Example: *Incorrectly informing the target of a false time when you claim to be starting an activity.*

6BM: Perception

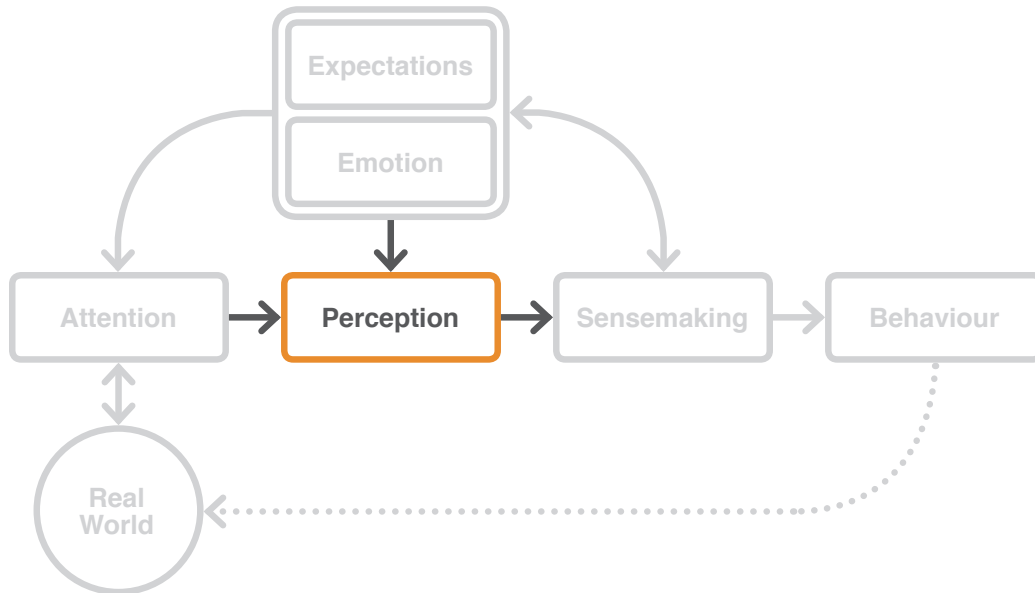


Figure 7 - Perception in the 6BM

What features do my sensors detect?

Perception is the process of interpreting sensory information to understand the features present in the environment. Perception is not merely the passive receipt of these signals, but is shaped by learning, memory, and expectation (Bernstein, 2010; Gregory & Zangwill, 1987). Perception involves both ‘top-down’ effects as well as a ‘bottom-up’ process of processing sensory input (Gregory & Zangwill, 1987, pp. 598–601). Our brain’s interpretation of sensory inputs is prone to error, and the perception derived from every primary sense can be fooled.

For example, our sight can easily be fooled into perceiving movement from a static image (Kitaoka, 2004), into seeing things in front of our eyes that are not actually there (in effect, experiencing a micro-hallucination)(Tangen, Murphy, & Thompson, 2011), and into not seeing things that are present within our visual field (Chabris & Simons, 2010). Our hearing can be fooled into perceiving an ever rising or ever descending tone, that in fact comprises a short repeated loop of evolving chords (Shepard, 1964). Our sense of touch can be fooled into perceiving pain by simultaneously experiencing lukewarm and cool temperatures in close physical proximity (e.g. Craig & Bushnell, 1994; Thunberg, 1896). Our taste perception can be fooled by substances that change our perception of sour tastes into sweet (Theerasilp & Kurihara, 1988), by scent and associated contextual volatiles (Tieman, Zeigler, Schmelz, Taylor, Bliss, Kirst, & Klee, 2006), and also by the audio we are listening to while tasting (Barnett-Cowan, 2010). And

our ability to smell can be manipulated through the verbal labelling of what we are smelling (Herz & von Clef, 2001). Other human senses can also be manipulated and fooled, such as our sense of proprioception (knowing where our body is in space)(Botvinick & Cohen, 1998) and also our perception of time (Kuhn & Findlay, 2010; Macknik & Martinez-Conde, 2004; Wada, Masuda, & Noguchi, 2005).

The most important thing to note about all these kinds of illusions is that they are not phenomena that occur exclusively in the laboratory using special stimuli; they occur in the 'real world', and are open to being deliberately invoked and exploited.

Barton Whaley (1928-2013) was a military deception practitioner, theorist, teacher and author. In a 1982 book co-authored with J. Bowyer-Bell, he published his taxonomy of deception strategies that has since been applied widely to analyse and describe deception in a range of different environments, including cyber.

Whaley applies his taxonomy to the entire act of deceiving. However, as the strategies involved are based on the acts of 'hiding' and 'showing', they feature in the Six Block Model (6BM) as strategies for manipulating Perception.

Whaley's taxonomy comprises two different classes of strategy: hiding things that are real, and showing things that are false. Each class has three associated strategies.

Whaley's strategies comprise:

- **Hiding the real (dissimulation)**, via: masking (putting something between the target and the object, or making the object resemble and blend into its background); repackaging (wrapping the object in other signifier cues); and dazzling (breaking up the object's pattern of cues).
- **Showing the false (simulation)**, via: mimicking (making the object resemble something else by adopting its cues); inventing (creating an alternative object from scratch) and decoying (creating a competing target object with a greater source of conspicuity).

Note also that the term 'object' is used here in a highly generalised sense; these strategies in reality can be applied to stimuli that are discernible across all senses (e.g. one might mask a scent, or repackage a sound). Whaley also states explicitly that a single case of deception may involve multiple strategies operating in concert, including hiding and showing strategies operating simultaneously.

6BM: Sensemaking

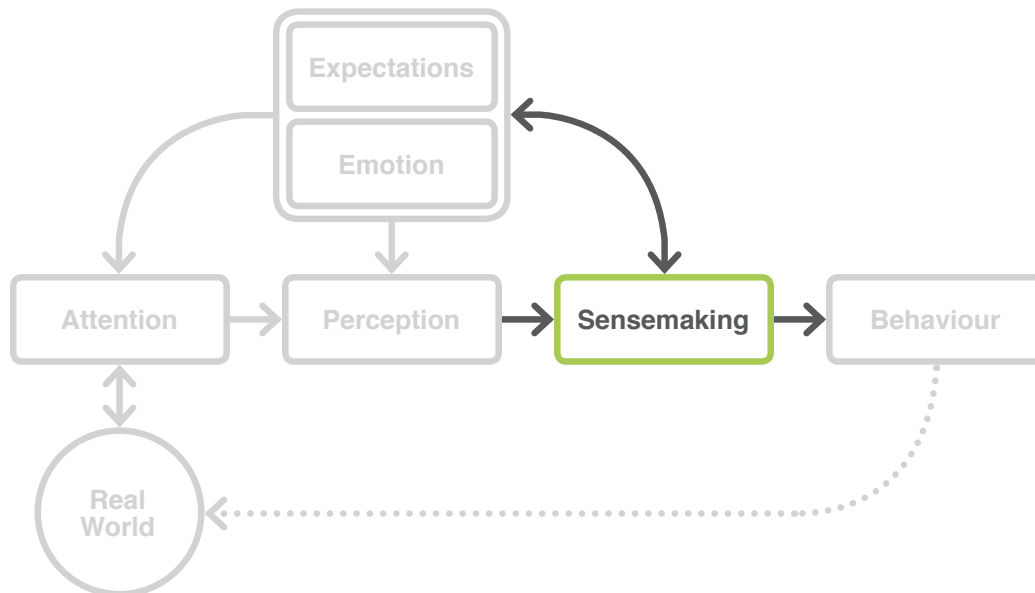


Figure 8 - Sensemaking in the 6BM

What's going on, and what should I do about it?

A schematic depicting the process of pattern matching is shown in Figure 10. Klein, Moon, and Hoffman (Klein, Moon, & Hoffman, 2006a, 2006b) suggest that people make sense of their experience through a process of pattern matching. Pattern-matching can be either a subconscious, or a conscious and deliberative activity that enables people to make sense of their world. Humans learn by mentally creating patterns (characteristic associations, or 'frames', which may comprise stories, maps, organizational diagrams, or scripts) among objects, properties, behaviours, and causes and effects (the 'data' perceived from the environment). Consequently, these patterns are stored as mental models, and are employed as templates against which to compare our perception of real world features. Our 'pattern library' is thus our experience. When we see characteristic collections of cues that together we recognize, this triggers the activation of the relevant pattern, which creates meaning and tells us the set of expectations and actions that are appropriate for the situation at hand – a process known as 'Recognition Primed Decision Making' (Klein, Calderwood, & Clinton-Cirocco, 1986). The spectator's expectations about what will happen in the environment then in turn direct their attention and ongoing collection of additional environmental data. Frames therefore determine what counts as data (i.e. which data are noticed or searched for) while at the same time, the perceived data activate, shape or generate the frames themselves (we thus construct our frames based on previously experienced data relationships). Our experience of what

goals to formulate, and what associated actions to take in a given recognised situation then forms the basis for generating a course of action. This process is depicted in Figure 9.

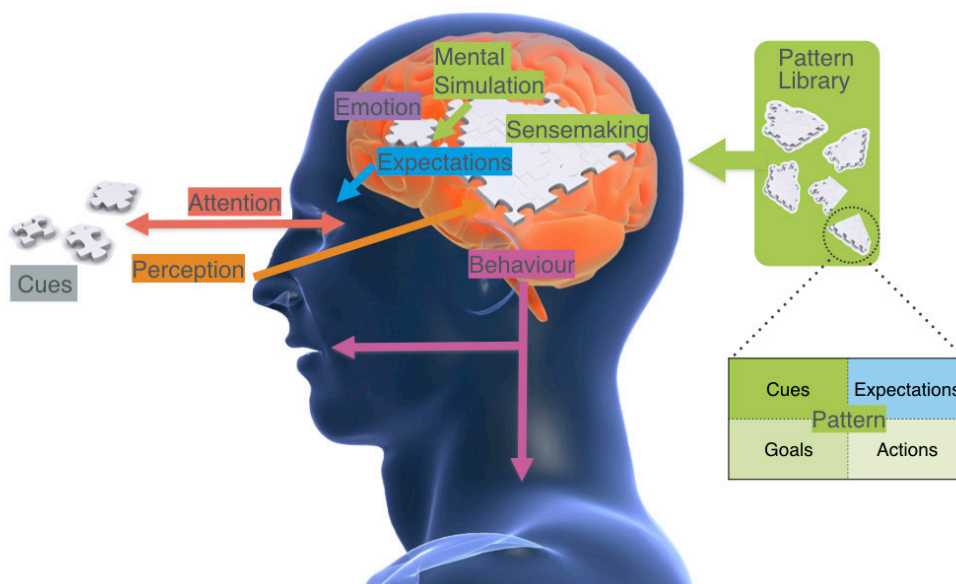


Figure 9 - Experiential Pattern Matching as Part of Sensemaking

Our desire to identify patterns is inbuilt and extremely powerful. We will even spot patterns when none are present (a phenomenon known as pareidolia, that includes, for example, seeing faces in clouds); and we are involuntarily motivated to auto-complete incomplete patterns, filling-in any gaps with our assumptions and expectations (Hoffman & Fiore, 2007).

The timeline against which cues are detected itself forms an integral component of the patterns we detect. Indeed, if cues are detected in a manner that is temporally incongruous, this may trigger a search for deeper understanding, potentially leading to the discovery of deceptive action. For example, if somebody you are conversing with online replies with large quantities of text almost instantaneously, it might arouse your suspicion that the person is cutting and pasting large blocks of pre-defined text, or potentially, that they are not a person, but an automated 'bot'.

The basis of all structural deception (that is, deception that relies on the arrangement of and relations between the parts or elements of a complex whole) lies in the manipulation of a target's sensemaking process. Strategies for affecting sensemaking include:

- Exploiting the target's prior beliefs via manipulation of patterns that are familiar to the target (and that they therefore will be vulnerable to recognising).
- Building erroneous experiential patterns in the head of a target, through repetition, conditioning, and the portrayal of false cause and effect.
- Leading a target to make erroneous assumptions, by encouraging them to auto-fill the gaps in a pattern.
- Increasing a target's belief in the validity of pattern they have detected by making them invest mental effort to build it (for example, by forcing them to assemble pattern fragments located in different places against a disjointed temporal base).
- Prompting the target to engage in search behaviours by creating ambiguous or uncertain patterns, and exploiting this by planting information in the locations where it is anticipated the target will search. Any suspicion of deception on the part of the target can also be anticipated and countered in this manner.
- Creating surprise by violating the target's patterns and expectations.
- Creating different partial patterns in the heads of different target audiences, who will then fit cues perceived by both to complete these patterns, thereby arriving at different meanings based around the common indicator. Making sense of the same thing in different ways is known as the 'Rashomon Principle'. The principle is named after a 1950 film called 'Rashomon' by the Japanese director Akira Kurosawa, where in ancient Japan, a woman is raped and her husband killed. The film gives us four viewpoints of the incident – one for each defendant – each revealing a different interpretation of the same events. The principle is also referred to by magicians as 'dual reality', in which different spectators involved in a magic effect assume that everybody is witnessing the same effect, but in actuality different spectators are arriving at different meanings.

The difference between perception and sensemaking. It is important that the difference between perception and sensemaking is understood during the analysis or planning of all deceptive action. In simple terms, perception is about collecting data (on what we see, hear, etc.). Sensemaking is about deductions (putting the pieces together, working things out, arriving at an understanding and then deciding what to do about it).

Mental simulation. Central to the process of sensemaking is mental simulation, during which we play-out a possible or anticipated future in our head, much like playing a film-clip. In German, the term 'Kopfkino' is used to describe this process, which translates literally in English to 'head cinema'.

Pattern recognition and mental simulation give rise to two outputs that in turn affect other psychological processes: expectations and emotion.

6BM: Expectations

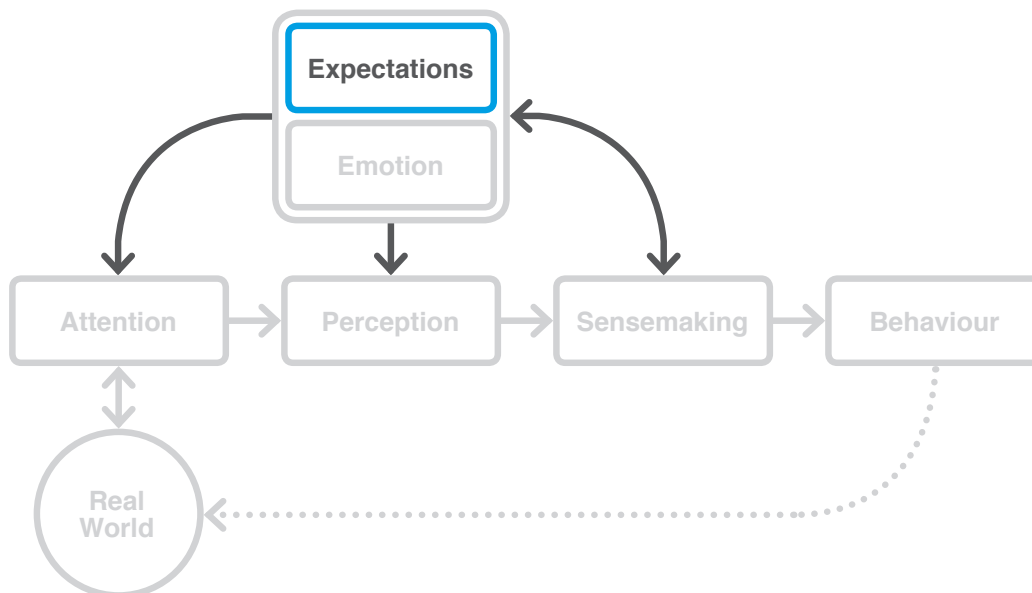


Figure 10 - Expectations in the 6BM

Expectations are beliefs about, and anticipations of the future, their formation based on pattern recognition and mental simulation. Our expectations are founded on our situational recognition, and on episodic memory of past similar situations (Szpunar & McDermott, 2008). Expectations are both a product of sensemaking, and in-turn impact on other psychological processes, including the sensemaking process itself (Klein, Philips, Rall, & Peluso, 2007).

- **Expectations affect attention.** We naturally direct our sensors towards where we anticipate something interesting will occur.
- **Expectations affect perception.** We are drawn towards subconsciously fitting what we perceive to match our expectations, especially if we believe something strongly enough. This tendency can be profound, and is open to many forms of deception.
- **Expectations affect sensemaking.** We are inclined to pay more attention to, and to believe more readily, information that aligns with our expectations than information that goes against them.

Expectations are extremely powerful, and have the potential to alter significantly what we experience, and the sense we make about the world around us, (for example, see: Plassmann, O'Doherty, Shiv, & Rangel, 2008). They can even counteract physiological limits within the human body (Langer, Djikic, Pirson, Madenci, & Donohue, 2010). Manipulating a target's expectations about the world

is thus fundamental to leading them to believe strongly in the 'alternate reality' you are seeking to formulate in their head.

Expectations can also be created in the head of a target, for example, by conditioning through repetition, or through the portrayal of false causality. And if a target's expectations are known or can be deduced (either because they have been created by the deceiver, or because of the environment in which the target is operating) then the deceiver may violate these expectations by doing something that is unexpected, catching the target off-guard and creating surprise. Violation of expectations is central to various domains of deceptive practice, including military deception (for example, leading the enemy to believe you are going to attack from one direction when you in fact attack from another) and also sport (for example, using the quarterback as a receiver in American Football).

6BM: Emotions

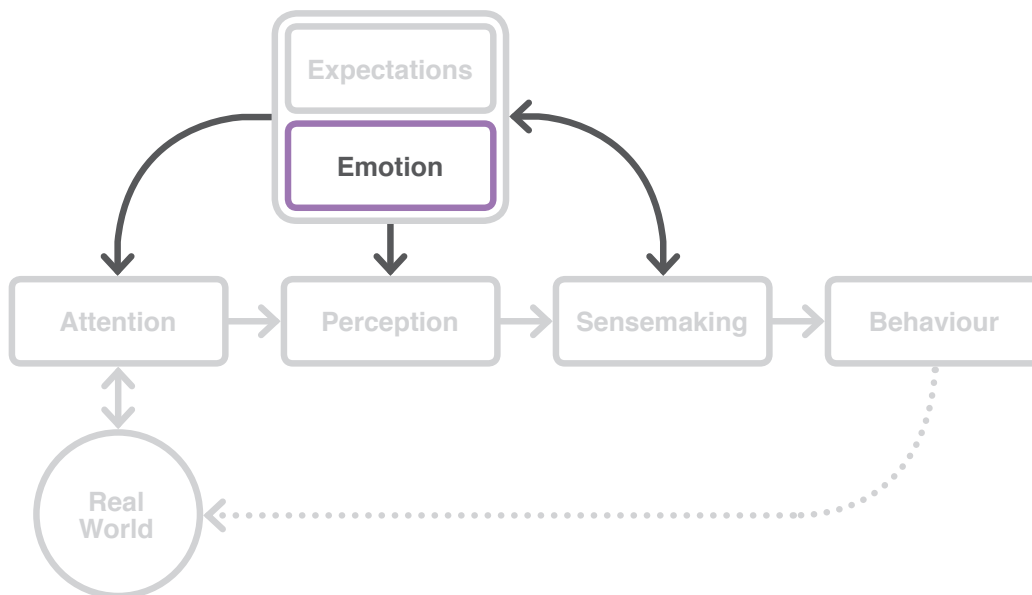


Figure 11 - Emotion in the 6BM

How do I feel about the situation?

Emotions are both a by-product of sensemaking, and they also shape the sensemaking process itself, directing patterns of thought, affecting risk perception, and modifying our preferences for different potential outcomes

Emotions are an affective state of consciousness, in which mental agitation is often accompanied by physiological changes (such as increased heart rate or respiration, or an overt manifestation, such as smiling, laughing, crying or shaking). Emotions are a by-product of sensemaking, in which individuals both consciously and unconsciously evaluate external stimuli or mental representations in terms of their perceived relevance for their current needs and goals, including considerations of their ability to cope with consequences (Scherer, 2003).

However, emotions also shape the sensemaking process itself, directing patterns of thought, affecting risk perception, and modifying our preferences for different potential outcomes. For example, experiencing anger and sadness has been shown to increase risk-seeking behaviours (Lerner & Keltner, 2001; Raghunathan & Pham, 1999); positive affect, as well as fear and anxiety tend to give rise to risk-averse choices (Isen, Nygren, & Ashby, 1988; Lerner & Keltner, 2001; Lerner & Tiedens, 2006). People with high levels of emotional intelligence are more likely to be overconfident in assessing emotion-laden situations, and are thus, paradoxically, more vulnerable to being deceived than people with low emotional intelligence (Baker, ten Brinke, & Porter, 2012).

Janis and Mann (Janis & Mann, 1977) also identified how errors in sensemaking and decision making can occur as a result of heightened emotions. They

identified that people in a state of ‘hypervigilance’ (a state of heightened vigilance resulting from stress) will be indiscriminately open to all information available, being unable to discriminate relevant from irrelevant.

Both positive emotions (happiness, excitement, joy, love, etc.) and negative emotions (anger, surprise, fear) affect sensemaking in similar ways. When we experience high levels of emotion, we tend to:

- Fixate on short-term, repetitive thought patterns (for example, replaying repeatedly what some apparently forthcoming money will be spent on).
- Narrow our span of attention (we may lessen our attention; or, if stressed, may increase the focus of our attention, but on fewer stimuli).
- Become less critical, and more vulnerable to deception (if part of our cognitive resources are given over to managing our emotions, we have less resource available for thinking critically about the situation at hand).
- High emotional states also lead people to simplify their pattern-matching process, choosing simple patterns over complex ones, or foreclosing their interpretation of a pattern (i.e. they come to an early conclusion as to what the set of cues means).

While something of a simplification, for present purposes it is useful to differentiate between negative emotions referred to here as ‘stress’, and positive emotions referred to here as ‘arousal’:

- Stress can arise from *physiological* causes that affect the body physically (such as extremes of heat, cold, noise, pain, etc.), *emotive* causes (such as shock, surprise, fear, etc.), and *cognitive* causes (such as information overload, rapidly changing information, incomplete information; uncertain or ambiguous information; missing information; time pressure; etc.).
- Arousal is a heightened emotional state derived from receiving pleasure, or from the anticipation of receiving pleasure. For example, a target may become aroused at the prospect of receiving money, love, sex, security, health, etc.

Finally, emotion may be a critical cue that convinces a target to accept a larger pattern – for example, during a change raising confidence trick, if you (really) had been handed too little change back during a financial transaction you would naturally be expected to exhibit signs of distress and protestation. Without the presence of such cues, your claims might not be believed. The six-block framework explicitly includes emotion as a fundamental building block of deception, and it must be considered in the design of all deceptive action. Such phenomena give rise to The Paper Moon Principle, named after a scene in the 1973 film directed by Peter Bogdanovich in which a young girl participates in a scam and uses her own emotion to put her deception target under duress:

The Paper Moon Principle

A target’s sensemaking can be fooled using a simpler or lower-resolution pattern, if the target is in a heightened emotional state.

6BM: Behaviour

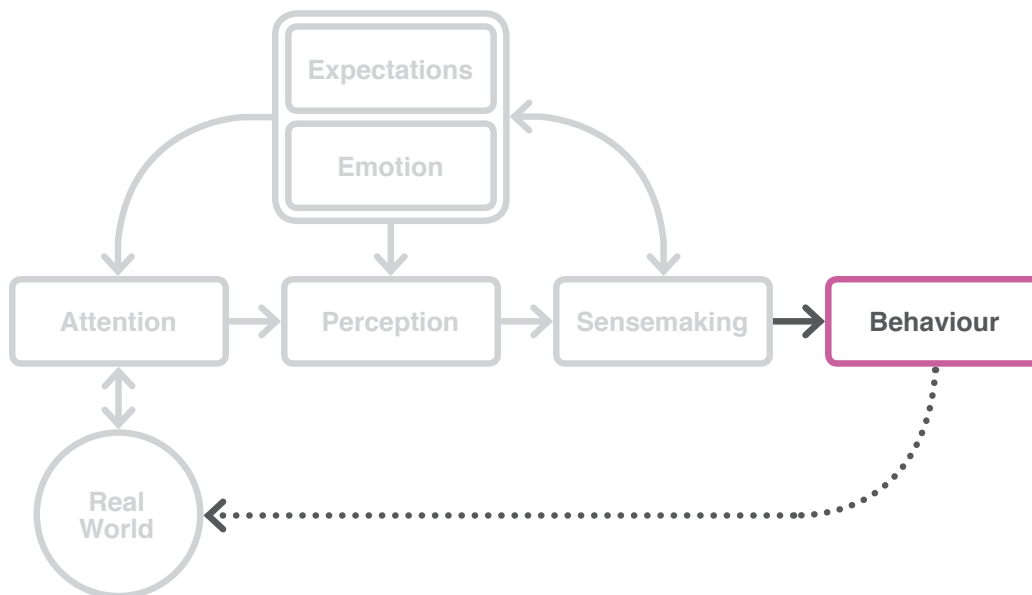


Figure 12 - Behaviour in the 6BM

What action should I take – and what action do I *think* I am taking?

Behaviour comprises voluntary and involuntary actions and communications generated in response to both environmental and internal stimuli. Behavioural intent is derived by the sensemaking process, through the pattern-based triggering of appropriate behaviours for recognised situations. Once a target has been induced into making erroneous sense of the situation, they should (hopefully) engage in the desired behaviour. However, there exists a range of additional opportunities for adding further layers of deception, by affecting the target's understanding of their own behaviour. Strategies include:

- **Simulating behavioural conduct** by influencing the target to believe they are engaged in their intended behaviour and that they are thus making progress towards their intended goals, when in fact they are not. For example, moving a detected cyber attacker into a sandbox (i.e. a virtual computer system running inside another computer) where their actions will cause no harm to the real system, but where they can be studied by the defender. So far as the attacker is concerned, they are conducting real actions against a real system.
- **Dissimulating behavioural conduct** via hiding or disguising the target's real actions from them. For example, sending a target an email stating that they were not in when a delivery was attempted, and inviting them to click a link to arrange re-delivery. The link in reality takes them to site which will

automatically install malware on their computer. In this case, the real action that the target is taking (installing malware) is not known to them.

- **Simulating behavioural outcomes** through hiding or disguising the real impact of the target's actions, leading them to cease pursuing goals as they believe they have already been accomplished. For example, in the early 1990s during the Balkans conflict, Serbian decoy aircraft built from wood would be packed with fuel canisters, so that if bombed they would display a realistic outcome of that behaviour (i.e. explode in a fireball).
- **Dissimulating behavioural outcomes** by means of hiding or disguising the real impact of the target's actions from them, leading them to continue pursuing goals they have already met. For example, many Slot Machine designs have moved to only accepting payment via credit card. This means that the person playing them cannot see how much money they have spent, or if they have hit or exceeded their pre-determined budget.
- **Time-shifting behaviour** by influencing the target to believe that the action they are engaged in is occurring at a time that is different to reality. For example, as part of the Stuxnet attack on Iranian nuclear enrichment, a worm was introduced into the computer control systems that recorded real operational data, and later replayed this same data to operators as the centrifuges were made to spin out of control.
- **Constraining behaviour** through influencing the target to believe they have freedom of action when in fact their behaviour is being constrained to a limited subset of available actions, as a result of invisible limits placed on them. For example, when a magician demonstrates on stage that a box is solid, he will hit it in various places with a stick so the audience can hear the solid sound it makes. He will then invite a spectator onto the stage to inspect the box for themselves. In doing so, the magician will give the stick to the spectator, which immediately constrains their behaviour to a similar mode of inspection. In doing so, the spectator will not inspect the bottom of the box, which has a swinging flap enabling access to a stage trapdoor.
- **Channelling behaviour** by influencing or funnelling the target to direct their behaviour in a given direction or towards a particular outcome, without their awareness. For example, an online greetings card site will allow a user to select a card design, then personalise it terms of the graphics, add a message, then add the recipients email address, then add the sender's email address, and then, having moved the user through this series of stages, will inform them that the card has not yet been sent, as the user first needs to purchase a subscription to the site. Having made this prior series of commitments, the user is more likely to sign-up than to waste of their previous effort.
- **Divorcing behaviour** from outcome by hiding or obfuscating the causality between a target's actions and its outcomes. For example, climate change deniers will seek to divorce human behaviour from resultant global rises in temperate, suggesting a range of other causes, highlighting that the perception of a temperature rise is inaccurate, or suggesting that the data is not yet sufficient to be able to draw any meaningful conclusions.

6BM: The Real World

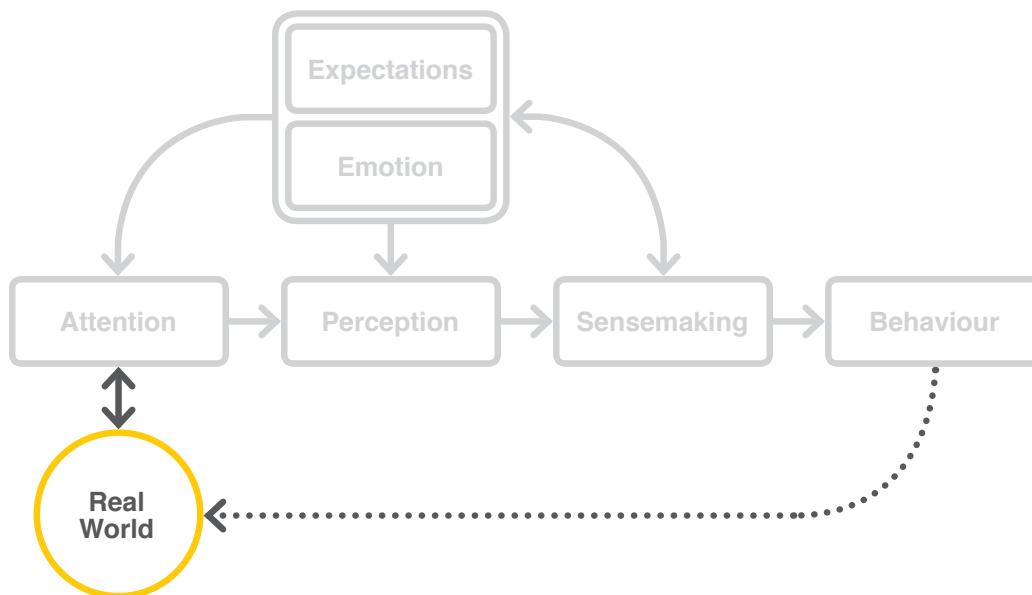


Figure 13 - The Real World in the 6BM

The final component of the 6BM is the Real World. The Real World is defined as follows:

Real World

Everything that exists outside of your head that is potentially accessible to others.

The Real World therefore comprises everything that does not exist as an internalized process of thought. All actions occur within, and in some manner therefore impact upon, the Real World. Importantly, within this context, cyber is considered to be part of the Real World, as all actions conducted within cyber can potentially be accessed by others.

The Real World contains the cues that we attend to and perceive, that inform our sensemaking. Our resultant behaviour in turn interacts with and impact upon this same externalized Real World. The 6BM therefore comprises a continuous feedback loop between the externalized Real World, our internalized understanding of it, and the actions we take that impact upon it.

A note on deception and culture

Do people from different cultures think about the world in fundamentally different ways and, if so, are different approaches required to deceive them? This is an important question, as it addresses directly the way in which targets formulate and recognise patterns. Two alternative broad schools of thought exist as to the relationship between sensemaking and cognition. The debate focuses primarily on the way in which humans seek to ‘categorise’ features in the world, the language they use for describing categorisations, and whether such categorisation has an impact on sensemaking processes.

A broad view from both evolutionary psychology and cognitive science is to assume that all appreciable human characteristics are ‘hard wired’ and, thus, all humans generally employ the same basic level categories to make sense of their world (Pinker, 2003). This view postulates that everyone, regardless of their cultural background, uses similar classification categories as a result of being exposed to the same structural features in the world, and thus goes about making sense of the world in the same way. Much empirical research has borne this idea out (Boster & d’Andrade, 1989; Malt, 1995) and evidence also suggests that this common approach to thinking can be ‘fooled’ consistently across cultures (Henderson, Pascual, Outteridge, Cowx, Helman, & Lambillion, 2007). For example, a conjuring trick that makes an object disappear from somebody’s hand can be transferred to any culture, irrespective of how somebody classifies the object that is vanished (although the vanish itself may be classified as a magic trick, or as supernatural act, etc., depending on culture). As a further example, the same methods employed to con people out of their money or possessions are seen in many different cultures around the world, although the value placed upon this act of deception (the seriousness, etc.) may differ between cultures (Haithem, Ayisi, & El-Hedhli, 2014).

An alternative view is that people from different cultures categorise things in fundamentally different ways, and thus go about making sense of the world differently. Much of this thinking is associated with the study of linguistics, and the emergent view that different patterns of language yield different patterns of thought. Cultural differences have been found in the language (and approaches to thinking) associated with time, space, objects, relationships, events, shapes, numbers, colours, etc. For example, according to Boroditsky (Boroditsky, 2003), English distinguishes between putting things into containers (e.g. ‘the apple in the bowl’, ‘the letter in the envelope’) and putting things onto surfaces (e.g. ‘the apple on the table’, ‘the magnet on the refrigerator door’). Cross-cutting this containment/support distinction, Korean distinguishes between tight and loose fit or attachment. For example, putting an apple in a bowl requires a different relational term (“nehta”) than putting a letter in an envelope (“kittaq”), because the first is an example of loose containment and the second an example of tight fit.

Furthermore, putting a letter in an envelope and putting a magnet on the refrigerator are both described by “kitta” because both involve a close fit.

Nisbett (Nisbett, 2004) has taken such work further, and has gathered evidence that suggests that those brought up in Western and non-Western cultures think differently from one another in scientifically measurable ways (much of Nisbett’s data comes from measuring reaction times in recalling previously shown objects). For example, Nisbett purports that Chinese, Korean, Japanese and other Asian cultures are measurably more holistic in their perceptions (taking in whole scenes rather than a few stand-out objects). Westerners, or those brought up in Northern European and Anglo-Saxon-descended cultures, have a “tunnel-vision perceptual style” that focuses much more on identifying what’s prominent in certain scenes and remembering it.

Culture is a complex and contentious topic, and there is no single set of prescriptive guidance that can be provided. However, the key cultural issues for deception planners to bear in mind are:

- All humans possess the faculties of attention, perception, sensemaking, expectations and behaviour, and such processes can be fooled irrespective of culture.
- The planning process used for thinking through a deception activity (the Deception Seven Questions – see p.67) can be applied generically to a target from any cultural background.
- The content and delivery mechanism of the deception activity are culturally dependent, and must reflect the cultural characteristics of the target. Beliefs, expectations, stories, patterns, cues, emotions, technologies and channels are all grounded in culture, and cultural relevance and meaning is critical to successful deception that exploits these features.
- Culture is potentially exploitable (both by the deception planner, and by the adversary). Indeed, it may be worth considering the feasibility of operating outside of the adversary’s culture and associated thought processes, if this approach can be used to gain advantage and help facilitate deception.

For a good review of culture and deception, the reader is referred to work by Gerwehr (Gerwehr, 2006), and Bennett and Waltz (Bennett & Waltz, 2007, pp. 210-212) provide an excellent analysis of the competencies required for cultural awareness (while presented in the context of counter-deception, such competencies are also invaluable to the planner seeking to conduct deception against targets from other cultures).

Applications of the 6BM

The structure of the 6BM can be used for a variety of purposes, including:

- **Description** – The 6BM can be used to structure an account of a case of deception, by identifying the psychological processes that were targeted, and the strategies (or gambits) by which these processes have been manipulated. The 6BM thereby provide a rich language for describing deception.
- **Analysis** – The 6BM structure can support the systematic analysis of past (retrospective), current (ongoing), or future (prospective) cases of deception to support insight, learning and communication. The 6BM can also potentially be used as graphic primer for representing a case of deception via a hierarchical decomposition of the activity and codification of inherent gambit use (see later).
- **Target Audience Analysis** – The 6BM can support a structured consideration of a target's 6BM activities and state. The structure can thus help identify critical information requirements for understanding potential leverage points, and information about the target can be grouped against the 6BM to inform the planning of deceptive action.
- **Planning and design** – The 6BM can also provide a structure for supporting the conceptualisation and design of deceptive action, working through the model backwards, from behaviour to attention. The structure can also prompt associated generative questions, such as 'What do I want the target to do, and why?' for behaviour, and 'What pattern(s) does the target need to recognise to formulate the belief necessary to engage in the desired behaviour?', etc., working back to questions about attention. For each block of the 6BM, the process of answering the question can potentially be enabled by the block's associated gambits. This process could also be applied to enhance the design of more engaging deceptive activities – such as stories, scripts, games, puzzles, mysteries, environments or products that confound, surprise, fool and delight those who encounter them.
- **Communication** – The 6BM, when worked-through back-to-front, also provides a systematic and logical structure for explaining or briefing a deceptive course of action to others.
- **Counter-deception** – The 6BM provides a structure for enhancing self-awareness, and critiquing the processes that one (or, at a larger level, one's organisation) is employing (usually automatically, and without conscious awareness) to make sense of the world and generate action. In this application of the 6BM, awareness is raised and attention drawn to assessing

the states and activities of each process within the 6BM using a generative question set. For example: “Where am I attending (i.e. pointing my sensors) and why? Has my attention be attracted through conspicuity, directed by saliency, or directed because of my expectations? Where am I not attending, and why?”, etc.

- **Training** – The 6BM provides a systematic and logical structure for the delivery of deception education and training, and together with educational components can provide a foundation for enhancing counter-deception competency (including the detection and management of deception), or competency in the development and execution of deceptive action for those that have a professional requirement to deceive others (such as the military, law enforcement agencies, or intelligence and security organisations).
- **Software support** – The 6BM also has the potential to inform the development of software to support deception-related activity, such as provision of support to the conceptualisation of deceptive action and deception planning, structuring the management and evaluation of potentially deceptive evidence, supporting the critiquing process required for counter-deception, enabling deception analytics, and guiding the briefing and communication of deceptive intent.

The 6BM Universal Question Set

As indicated, the 6BM can support a variety of different applications. Central to thinking about deception in each of these applications is asking the right kinds of questions. The applications each involve a different locus of consideration, and a different timeframe, which themselves change a core set of questions based upon the different components of the 6BM. A summary of the different question sets is shown in Figure 14. Reading across the table for a given building block of the 6BM, it is possible to see how the focus and timeframe modifies the question in support of the desired application.

The 6BM is a generic structure that can be used to understand deception in any domain in which occurs. And while the model leans towards human structural deception, it can also be used to explore other forms of deception in both human and non-human domains. Some examples are now explored over the page.

Application	Target Analysis	Planning	Counter-Deception
Focus	Target	Target	Self
Timeframe	Current	Future	Current
Attention	Where is the target looking?	Where do I want the target to look?	Where am I looking?
Perception	What does the target see/notice and not see/notice?	What do I want the target to see/notice, and not see/notice?	What am I seeing/noticing?
Sensemaking	What does the target believe is happening?	What do I want the target to believe is happening?	What does this mean / What do I believe?
Expectations	What does the target think will happen?	What do I want the target to think will happen?	What do I think will happen?
Emotions	What are the target's feelings?	How do I want the target to feel?	How do I feel?
Behaviour	What is the target doing?	What do I want the target to do?	What am I doing?

Figure 14 - The 6BM Universal Question Set

Using the 6BM for understanding interpersonal deceptive communication

The terms 'lying' and 'deception' often are used interchangeably, especially in the context of 'deception detection' referring to the detection of lying (e.g. see: Ben-Shakhar & Eyal, 2003; Granhag & Strömwall, 2004; Granhag, Vrij, & Verschuere, 2015; Leal, Vrij, Nahari, & Mann, 2016; Millen, Hope, Hillstrom, & Vrij, 2016; Tyler, Feldman, & Reichert, 2006). Indeed, an entire conference on the topic of 'deception' primarily featured presentations about lie-detection (University of Cambridge, 2015).

While the field of lying and lie-detection is undoubtedly a valid and important field of research with the potential to support both the public and many different organisations, it forms but one small subset of the field of deception research. Indeed, it is suggested that lying provides an impoverished paradigm for the study and understanding of deception more broadly, as the paradigm is not transportable to other domains, is not scalable from individual to organisation, and is not generative. Furthermore, some philosophers suggest that lying and deception are two entirely different phenomena, as lying depends on making false statements, and while deception may be founded on making true statements, it does not actually require any statements to be made at all (Carson, 2009, p. 179). To further exemplify this differentiation, one might consider what studies of lying have (if anything) to contribute to an understanding of animal deception, to explaining the basis by which a magic effect fools an audience, and to teasing apart the strategies involved in one military force deceiving another as to the timing and location of its attack?

How then does the 6BM relate to lying as a subset of deception? It is suggested that the following features of the 6BM can support an enhanced understanding of lying phenomena:

- It is proposed that the definition of deception offered in this paper holds true for lying. That is, lying is intended to shape a target's behaviour by manipulating their sensemaking about the real world, in order that the liar gains advantage.
- The different components of the 6BM help explain the target's mental processes that are being manipulated. For example, while the target will be attending to the interviewee's (or speaker's) statements, the interviewee may seek to draw attention to particular parts of their story, and seek to avoid attention being paid to other parts. Clues may be communicated by the interviewee that are intended to be pieced together over time (potentially, across multiple interviews) via the target's sensemaking process. And finally, the interviewee may be seeking to manipulate both the target's expectations (that may shape their subsequent questioning strategy) and the target's

emotional reaction to their understanding of the interviewee's credibility (i.e. they may be trying to avoid the interviewer becoming excited, angry, suspicious, etc., and instead try to influence them to feel happy, liked, trusted, etc.).

- The 6BM can provide an analytical framework in which contextual, physical, and other relevant information/evidence from a situation of interest can be managed integrated with information supplied by the interviewee. The consistent framework of the 6BM can thus draw together diverse sets of information and evidence in different formats from different sources.
- The generative question set for supporting counter-deception could be applied to critique and identify how an interviewee may be seeking to deceive through lying.

Summary

The 6BM framework comprises a simplified representation of six core psychological processes that all humans, irrespective of culture, use to make sense of the world and generate action. In this sense, the framework is not specific to the study of deception; however, it provides a useful and actionable structure for both explaining and designing deceptive action. The 6BM also provides a structure that can be used for analysing the relationships among analogous process in other entities, such as states, micro-organisms and technology.

In reality, all the processes described in the 6BM operate simultaneously in one complex and aggregate activity for making sense of the world and generating action, known colloquially as 'thinking'. Everything is connected to everything else, and there is no real notion of 'flow' as portrayed. However, separation of the processes into distinct elements provides the basis for a loose prescriptive sequence of steps for understanding influence and deception activity.

The processes are proposed as being interdependent. Attention steers perception, perception feeds sensemaking, sensemaking generates expectations and emotions (outputs that in turn shape other processes) and sensemaking also drives behaviour.

Each process can be targeted and influenced independently to achieve different kinds of effect on the target's thinking and behaviour. However, influencing interdependent processes is contingent on influencing preceding processes (i.e. later processes can only be influenced by manipulating the earlier processes that impact on them – for example, a target's sensemaking can only be influenced by first controlling the target's attention, and then shaping its perception).

Using this practical simplification of how our brains work it becomes possible to re-examine our general understanding of a target and begin to draw out a more nuanced set of questions for planning deception operations, analysing deception activity, and detecting deception activity aimed towards us.

**“...you aren’t
going to have
many good ideas
unless you have
lots of ideas.”**

Linus Pauling, American chemist and Nobel laureate

“Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so.”

(Adams & Carwardine, 1990)

CPD – Continuing Professional Development for deception practitioners

Introduction

In humans, deception is a deeply ingrained social-psychological strategy, the purpose of which is to gain advantage for attacker and/or defender. The use of deception can be found in fields as diverse as advertising and marketing, magic, practical jokes, verbal and non-verbal communication, politics, social engineering, the psychic industry, sport (both as a tactic, and as cheating), gambling, financial fraud, and many other domains. In all of these domains the competitive advantage belongs to actors who adopt an active stance towards both the threat of deception and the opportunities that it offers. That said, (Whaley, 2006a) argues that:

“Opportunities to gain experience in deception are limited... ..one should not be surprised that so few people throughout history manage to become an expert at the deception game... More can be learned by studying better experienced deceivers.”

(Whaley, 2006a, pp. 31-50)

In this spirit of learning from other deceivers, it is recommended that those interested in developing their deceptive thinking skill should become more hyperacuitive, noticing examples of when deception is present in their environment, and seeking to understand and learn from such opportunities.

The frameworks in this handbook provide the scaffolding for building and strengthening your understanding. It provides a structure for breaking deception down into its building blocks, and a set of explanations for how deception is enacted. This understanding can be applied to any environment in which deception occurs.

Developing your influence and deception skills

To strengthen your deception skills, it is recommended that you seek every opportunity to understand, spot and critique the use of:

- The Six Block Model. Use the 6BM as a tool for deconstructing deception into its constituent parts.

- Deception Gambits and Influence Strategies. See if you can find how these strategies have been employed in the cases you are considering.
- Spot and study influence and deception across multiple domains you encounter. Do not limit your study to just your domain of practice. Make a point of studying deception in other domains, including the wide range of domains referenced in this handbook
- Study expert influencers and deceivers in other domains. Make a point of learning about the individuals who have become experts at deception. How did they become so skilful? Where did they learn from? What did they read? And who did they study?
- Link theory to your practice of deception. As you build your theoretical understanding of deception, seek to apply it to your professional practice. Use the theory to guide your practice, and use your practice to expand and develop your theory.

Summary

Opportunities to enhance your deceptive thinking are all around you, if you just keep your eyes open. Next time you visit a supermarket, read an advertisement, watch a politician being interviewed, observe a magic effect, or visit the zoo, take the opportunity to enhance your understanding about deception.

Visit www.artifice.co.uk to explore our range of professional courses that comprehensively support deception and influence practitioners operating in adversarial contexts.

In conclusion

“If you can only be good at one thing, be good at lying... because if you’re good at lying you’re good at everything.”

John Lefevre, Author of Straight to Hell

Handbook summary

In the introduction to this handbook, under the heading ‘An overview of the Artifice System’, a general sequence for designing deceptive action was presented. This handbook has presented a broad set of components that can be applied following this sequence (or adapted and used as circumstances dictate) to design sneakier, more systematic, more transparent and accountable, and overall more professionally designed and executed deceptive action.

The components of the Artifice System are domain independent, target independent, and are scalable from individuals to collective targets, and should help practitioners across a broad variety of the operational domains and challenges they face. It is intended that this handbook should support influence and deception practitioners in designing better plans that they can explain more clearly to their managers, helping to instil and inspire management confidence, increasingly the likelihood of obtaining sign-off, and subsequently enabling the execution of successful operations that achieve desired outcomes, while also providing a wealth of auditable and accountable information to support broader organisational learning.

Influence and deception operations are specialised, complex and potent activities that can have far-reaching consequences. They have the potential to do incredible good in the world, as well as incredible harm if they are not planned and executed effectively. Such activities should therefore only be undertaken by qualified, trained, self-aware and conscientious professionals operating within a context of, and constrained by, organisational, legal and ethical oversight.

Post-note

The author of this handbook and Artifice Ltd would welcome feedback (both positive and negative) on the utility of these ideas, and are available to consult on their effective application. Should you have any feedback, questions or general queries, please do not hesitate to contact the team at: enquiries@artifice.co.uk.

**“When in doubt,
tell the truth.
It will confound
your enemies
and astound your
friends.”**

Mark Twain

Bibliography

- Adams, D., & Carwardine, M.** (1990). *Last Chance to See*. London: William Heinemann Ltd.
- Adams, E. S., & Caldwell, R. L.** (1990). Deceptive communication in asymmetric fights of the stomatopod crustacean *Gonodactylus bredini*. *Animal Behaviour*, 39(4), 706-716. doi: 10.1016/s0003-3472(05)80382-3
- Allmann, S., & Baldwin, I. T.** (2010). Insects betray themselves in nature to predators by rapid isomerization of green leaf volatiles. *Science*, 329(5995), 1075-1078. doi: 10.1126/science.1191634
- Amagase, S.** (1972). Digestive enzymes in insectivorous plants III. Acid proteases in the genus *Nepenthes* and *Drosera peltata*. *Journal of Biochemistry*, 72(1), 73-81.
- Bagnères, A.-G., & Lorenzi, M. C.** (2010). Chemical deception/mimicry using cuticular hydrocarbons. *Insect Hydrocarbons: Biology, Biochemistry and Chemical Ecology*, 282-323.
- Baker, A., ten Brinke, L., & Porter, S.** (2012). Will get fooled again: Emotionally intelligent people are easily duped by high-stakes deceivers. *Legal and Criminological Psychology*, no-no. doi: 10.1111/j.2044-8333.2012.02054.x
- Balazsi, G., van Oudenaarden, A., & Collins, J. J.** (2011). Cellular decision making and biological noise: from microbes to mammals. *Cell*, 144(6), 910-925. doi: 10.1016/j.cell.2011.01.030
- Barnett-Cowan, M.** (2010). An illusion you can sink your teeth into: Haptic cues modulate the perceived freshness and crispness of pretzels. *Perception*, 39(12), 1684-1686.
- BBC.** (2010). IT analysts stole £33,000 from London casinos. Retrieved 25/09/2013 from <http://news.bbc.co.uk/1/hi/england/london/8564741.stm>
- Bell, J. B., & Whaley, B.** (1982). *Cheating: Deception in war & magic, games & sports, sex & religion, business & con games, politics & espionage, art & science*. New York, N.Y.: St Martin's Press.
- Ben-Shakhar, G., & Elaad, E.** (2003). The validity of psychophysiological detection of information with the Guilty Knowledge Test: A meta-analytic review. *Journal of Applied Psychology*, 88(1), 131-151.
- Bennett, M., & Waltz, E.** (2007). *Counterdeception: Principles and Applications for National Security*. Norwood, MA: Artech House.
- Bernstein, D. A.** (2010). Recognizing the perceptual world. *Essentials of Psychology* (pp. 123–124). Independence, KY: Cengage Learning.
- Bessi, A., & Ferrara, E.** (2016). Social bots distort the 2016 U.S. Presidential election online discussion. *First Monday*, 21(7).
- Bodmer, S., Kilger, M., Carpenter, G., & Jones, J.** (2012). *Reverse deception: organized cyber threat counter-exploitation*. New York: McGraw-Hill.
- Borel, B.** (2015). Do Plants Get Stressed? Retrieved 26/11/2016 from <http://www.popsoci.com/do-plants-get-stressed>
- Boroditsky, L.** (2003). Linguistic relativity. *Encyclopedia of cognitive science*.
- Boster, J., & d'Andrade, R.** (1989). Natural and Human Sources of Cross-Cultural Agreement in Ornithological Classification. *American Anthropologist*, 91(1), 132-142.
- Botvinick, M., & Cohen, J.** (1998). Rubber hands 'feel' touch that eyes see. *Nature*, 391(6669), 75.
- Boush, D. M., Friestad, M., & Wright, P.** (2009). *Deception In The Marketplace: The Psychology Of Deceptive Persuasion and Consumer Self-protection*. New York: Routledge.
- Broderbauer, D., Diaz, A., & Weber, A.** (2012). Reconstructing the origin and elaboration of insect-trapping inflorescences in the Araceae. *Am J Bot*, 99(10), 1666-1679. doi: 10.3732/ajb.1200274
- Brown, D.** (2001). *Absolute Magic*. Bristol: Derren Brown.
- Byrne, R. W., & Corp, N.** (2004). Neocortex size predicts deception rate in primates. *Proceedings of Biological Science*, 271(1549), 1693-1699. doi: 10.1098/rspb.2004.2780
- Carson, T. L.** (2009). Lying, Deception, and Related Concepts. In C. Martin (Ed.), *The Philosophy of Deception* (pp. 153-187). Oxford: Oxford University Press.
- Cecelio, P., Perez-Cabezas, B., Santarem, N., Maciel, J., Rodrigues, V., & Cordeiro da Silva, A.** (2014). Deception and Manipulation: The Arms of Leishmania, a Successful Parasite. *Frontiers in Immunology*, 5. doi: 10.3389/fimmu.2014.00480
- Chabris, C. F., & Simons, D. J.** (2010). *The Invisible Gorilla: and Other Ways Our Intuitions Deceive Us*. New York: Crown.
- Chakrabortee, S., Kayatekin, C., Newby, G. A., Mendillo, M. L., Lancaster, A., & Lindquist, S.** (2016). *Luminidependens* (LD) is an Arabidopsis protein with prion behaviour. *Proc Natl Acad Sci U S A*, 113(21), 6065-6070. doi: 10.1073/pnas.1604478113
- Chief of Joint Operations - Permanent Joint Headquarters.** (1998). *Joint Doctrine Pamphlet 2/98: Deception*.
- Clarke, D.** (1972). Some Personal Reflections on the Practice of Deception in the Mediterranean Theatre from 1941 to 1945. In D. Mure (Ed.), *Master of Deception* (pp. 273-275). London: William Kimber.

- Cole, C., Jones, L., McVeigh, J., Kicman, A., Syed, Q., & Bellis, M. A.** (2010). *Cut: A guide to the adulterants, bulking agents and other contaminants found in illicit drugs*. Liverpool: Centre for Public Health, Faculty of Health and Applied Social Sciences, John Moores University.
- Conan-Doyle, A.** (1891). A Scandal in Bohemia. *The Strand Magazine*(July).
- Coyle, G. A., & Wilson, A.** (2013). Haversack Ruses—From Leather to Digital. *International Journal of Intelligence and Counterintelligence*, 27(1), 156-177. doi: 10.1080/08850607.2013.807197
- Craig, A. D., & Bushnell, M. C.** (1994). The thermal grill illusion: unmasking the burn of cold pain. *Science*, 265, 252-255.
- Daniel, D. C., Herbing, K. L., Reese, W., Heur, R. J., Serbin, T. R., Moose, P. H., & Sherwin, R. G.** (1980). *Multidisciplinary Perspectives on Military Deception*. (NPS-56-80-112). Monterey, California: Naval Postgraduate School.
- DCDC.** (2007). JDP 3-80.1: OPSEC, Deception and PSYOPS. (Joint Doctrine Publication 3-80.1). Shrivenham: Development, Concepts and Doctrine Centre.
- Dener, E., Kacelnik, A., & Shemesh, H.** (2016). Pea Plants Show Risk Sensitivity. *Curr Biol*, 26(13), 1763-1767. doi: 10.1016/j.cub.2016.05.008
- Ding, X. P., Wellman, H. M., Wang, Y., Fu, G., & Lee, K.** (2015). Theory-of-Mind Training Causes Honest Young Children to Lie. *Psychol Sci*, 26(11), 1812-1821. doi: 10.1177/0956797615604628
- Dobinson, C.** (2013). *Fields of Deception: Britain's Bombing Decoys of the Second World War*. York: Methuen.
- Drake, N.** (2012). Spider That Builds Its Own Spider Decoys Discovered. *wired.com*. Retrieved 21/11/2016 from <https://www.wired.com/2012/12/spider-building-spider/>
- Ekman, P.** (1985). *Telling lies : clues to deceit in the marketplace, politics, and marriage*. New York ; London: Norton.
- Erdnase, S. W.** (1902). *The Expert at the Card Table. Artifice, ruse, and subterfuge at the card table: a treatise on the science and art of manipulating cards*. Chicago: McKinney & Co.
- Evans, A. D., & Lee, K.** (2011). Verbal deception from late childhood to middle adolescence and its relation to executive functioning skills. *Dev Psychol*, 47(4), 1108.
- Evans, A. D., & Lee, K.** (2013). Emergence of Lying in Very Young Children. *Dev Psychol*. doi: 10.1037/a0031409
- Fitzkee, D.** (1945). *Magic By Misdirection*. San Rafael, CA: San Rafael House.
- Flower, T. P., Gribble, M., & Ridley, A. R.** (2014). Deception by Flexible Alarm Mimicry in an African Bird. *Science*, 344(6183), 513-516. doi: 10.1126/science.1249723
- Foote, A., & Spalding, W., R.** (1905). *Modern Harmony in its Theory and Practice*. Boston: The Arthur P. Schmidt Co.
- Ford, B. J.** (2004). Are Cells Ingenious? *Microscope*, 52(3/4), 135-144.
- Geitge, A.** (2017). How to break a CAPTCHA system in 15 minutes with Machine Learning. Retrieved 17/03/2018 from <https://medium.com/@ageitgey/how-to-break-a-captcha-system-in-15-minutes-with-machine-learning-dbebb035a710>
- Gerwehr, S.** (2006). Cross-Cultural Variation in Denial and Deception. *Defense Intelligence Journal*, 15(2).
- Gilbert, L. E.** (1971). Butterfly-plant coevolution: Has *Passiflora adenopoda* won the selectional race with heliconiine butterflies? *Science*, 172(3983), 585-586.
- Gilbert, L. E.** (1982). The coevolution of a butterfly and a vine. *Scientific American*, 247(2), 102-107.
- Goodman, K.** (2008). *Improvisation for the spirit: Live a more creative, spontaneous, and courageous life using the tools of improv comedy*: Sourcebooks, Inc.
- Göpel, Y., & Görke, B.** (2014). Lies and deception in bacterial gene regulation: the roles of nucleic acid decoys. *Molecular microbiology*, 92(4), 641-647.
- Granhag, P. A., & Strömwall, L. A. (Eds.)**. (2004). *The Detection of Deception in Forensic Contexts*. Cambridge: Cambridge University Press.
- Granhag, P. r. A., Vrij, A., & Verschuere, B.** (2015). *Detecting deception : current challenges and cognitive approaches*. Hoboken: Wiley.
- Gregory, R. L., & Zangwill, O. L.** (1987). *The Oxford companion to the mind*: Oxford University Press.
- Guilford, J. P.** (1967). *The nature of human intelligence*.
- Guillem, R. M., Drijfhout, F., & Martin, S. J.** (2014). Chemical deception among ant social parasites. *Current Zoology*, 60(1), 62-75.
- Haithem, Z., Ayisi, K. D., & El-Hedhli, K.** (2014). Consumer Fraudulent Behavior: a Cross-Cultural Perspective. *ASBBS Proceedings*, 21(1), 315.
- Hebborn, E.** (2004). *The Art Forger's Handbook*. Woodstock, N.Y.: Overlook Press.
- Heckman, K. E., Stech, F. J., Thomas, R. K., Schmoker, B., & Tsow, A. W.** (2016). *Cyber Denial, Deception and Counter Deception: A Framework for Supporting Active Cyber Defense*. New York: Springer.
- Henderson, S. M.** (2011). *Deceptive Thinking*. Paper presented at the 1st MilDec Military Deception Symposium, 2nd-3rd November 2011, Defence Academy of the United Kingdom, Shrivenham.

- Henderson, S. M., & Lewis, P.** (2012). *Understanding and Exploiting Cyber Deception and Disruptive Behaviour*. Farnborough: QinetiQ.
- Henderson, S. M., Pascual, R. G., Outteridge, C., Cowx, R. W., Helman, S., & Lambillion, S. M.** (2007). *A Review of Deception in non-military domains: Psychological principles*. (QINETIQ/D&TS/C&IS/CR0702827 /1.1). Farnborough: QinetiQ.
- Herman, A.** (2016). *Visual intelligence: sharpen your perception, change your life*. Boston: Houghton Mifflin Harcourt.
- Herz, R. S., & von Clef, J.** (2001). The influence of verbal labelling on the perception of odors: Evidence for olfactory illusions? *Perception*, 30(3), 381-391.
- Higham, J.** (2009). *Secrets of Improvisational Magic*. London: Justin Higham.
- Higham, J.** (2011). *The KOSBE System: The Mechanics of Improvisation in Card Magic*. London: Justin Higham.
- Hiller, I.** (1989). Killdeer: Introducing Birds to Young Naturalists The Louise Lindsey Merrick Texas Environment Series (Vol. 9, pp. 35-37). College Station, Texas: Texas A&M University Press.
- Hoffman, R., & Fiore, S. M.** (2007). Perceptual (Re)learning: A Leverage Point for Human-Centered Computing. *IEEE Intelligent Systems*, 22(3), 79-83.
- Holt, T.** (2008). *The Deceivers: Allied Military Deception In The Second World War (Vols 1+2)*. London: The Folio Society Ltd.
- Hotz, R. L.** (2011). The Truthy Project Ferrets Out Online Deception: In an era of digital deception, scientists at Indiana University are using Twitter to investigate the nature of truth, lies and politics. Retrieved 09/01/2012 from <http://online.wsj.com/video/the-truthy-project-ferrets-out-online-deception/219A2EA6-4D22-4F5B-8D96-81AF342104F7.html>
- HQ Dept of Army.** (1988). *FM 90-2 Battlefield Deception*. Washington: DOD Department of the Army.
- Hutton, R., Klein, G., & Wiggins, S.** (2008). Designing for sensemaking: A macrocognitive approach. Paper presented at the Computer Human Interactions 2008, Florence, Italy:.
- Hyman, R.** (1977). Cold Reading: How to Convince Strangers That You Know All About Them. *The Zetetic*, 1(2), 18-37.
- Isen, A. M., Nygren, T. E., & Ashby, F. G.** (1988). Influence of positive affect on the subjective utility of gains and losses: it is just not worth the risk. *J Pers Soc Psychol*, 55(5), 710-717.
- James, W.** (1890). *The principles of psychology*. New York: H. Holt and company.
- Janis, I. L., & Mann, L.** (1977). *Decision making: a psychological analysis of conflict, choice, and commitment*. London: Free Press; Collier Macmillan.
- Jansen, F., & Ganesh, M. I.** (2015). Is it possible to fool an algorithm? Making a case for data obfuscation. Paper presented at the Auditing Algorithms Workshop, International Conference on the Web and Social Media (ICWSM-15), May 26th-29th, 2015, Oxford UK.
- Jastrow, J. J.** (1888). The Psychology of Deception. *Popular Science Monthly*, 34, 145-157.
- Jersakova, J., Johnson, S. D., & Kindlmann, P.** (2006). Mechanisms and evolution of deceptive pollination in orchids. *Biol Rev Camb Philos Soc*, 81(2), 219-235. doi: 10.1017/S1464793105006986
- Johnson, R. U., & Buel, C. C.** (1889). *Battles and Leaders of the Civil War (1884 - 1888) (Vol. II)*. New York: The Century Co.
- Johnsson, R.** (1971). Too-Perfect Theory. *Hierophant* 5-6, 5/6, 247-250.
- Johnsson, R., Racherbaumer, J., Stone, T., Christian, M., Neale, R., Fitch, B., . . . Aronson, S.** (2008). *The Too Perfect Theory*: Lybrary.com.
- Jones, R. V.** (1942). Report No.13. D.T.: Beams/Radar (D.T. Paper). 10th January 1942. London: National Archives (National Cataloguing Unit for the Archives of Contemporary Scientists).
- Juels, A., & Ristenpart, T.** (2014). Honey encryption: Security beyond the brute-force bound. Paper presented at the Annual International Conference on the Theory and Applications of Cryptographic Techniques.
- Jürgens, A., Dötterl, S., Liede-Schumann, S., & Meve, U.** (2010). Floral scent composition in early diverging taxa of Asclepiadoideae, and Secamonoideae (Apocynaceae). *South African Journal of Botany*, 76(4), 749-761. doi: 10.1016/j.sajb.2010.08.013
- Jurgens, A., Dotterl, S., & Meve, U.** (2006). The chemical nature of fetid floral odours in stapeliads (Apocynaceae-Asclepiadoideae-Ceropegieae). *New Phytol*, 172(3), 452-468. doi: 10.1111/j.1469-8137.2006.01845.x
- Jürgens, A., & Shuttleworth, A.** (2015). Carrion and Dung Mimicry in Plants. 361-386. doi: 10.1201/b18819-20
- Karras, T., Aila, T., Laine, S., & Lehtinen, J.** (2017). Progressive growing of gans for improved quality, stability, and variation. arXiv preprint arXiv:1710.10196.
- Kirk, P. L.** (1953). *Crime investigation: physical evidence and the police laboratory*. . New York: Interscience Publishers.
- Kitaoka, A.** (2004). Dongurakokko (The donguri wave). Retrieved 28/07/2013 from <http://www.psy.ritsumei.ac.jp/~akitaoka/saishin2e.html>
- Klein, G.** (1993). Characteristics of commander's intent statements. Paper presented at the The 1993 Symposium on Command and Control Research, McLean, VA.

- Klein, G., Moon, B., & Hoffman, R. R.** (2006a). Making Sense of Sensemaking 1: Alternative Perspectives. *IEEE Intelligent Systems*, 21(4), 70-73.
- Klein, G., Moon, B., & Hoffman, R. R.** (2006b). Making Sense of Sensemaking 2: A Macrocognitive Model. *IEEE Intelligent Systems*, 21(5), 88-92.
- Klein, G., Philips, J. K., Rall, E. L., & Peluso, D. A.** (2007). A Data-Frame Theory of Sensemaking. In R. Hoffman (Ed.), *Expertise Out of Context: Proceedings of the Sixth Conference on Naturalistic Decision Making* (pp. 113-155). New York, NY: Lawrence Erlbaum Associates.
- Klein, G. A., Calderwood, R., & Clinton-Cirocco, A.** (1986). Rapid Decision Making on the Fire Ground. Paper presented at the Human Factors and Ergonomics Society 30th Annual Meeting, Dayton, Ohio.
- Knodler, L. A., Celli, J., & Finlay, B. B.** (2001). Pathogenic Trickery- Deception Of Host Cell Processes. *Nature*, 2(8), 578-588. doi: 10.1038/35085062
- Kondev, J.** (2014). Bacterial decision making. *Physics Today*, 67(2), 31-36. doi: 10.1063/pt.3.2276
- Kotler, P., & Armstrong, G.** (2006). *Principles of Marketing*. London: Pearson Prentice Hall.
- Kubovy, M., & Tyler, C.** Psychology of Perspective and Renaissance Art: Illusion, Delusion, Collusion, and Perceptual Paradox. Retrieved 13/03/2018 from <http://www.webexhibits.org/arrowintheeye/illusion3.html>
- Kuhn, G., & Findlay, J. M.** (2010). Misdirection, attention and awareness: inattention blindness reveals temporal relationship between eye movements and visual awareness. *Q J Exp Psychol (Hove)*, 63(1), 136-146. doi: 10.1080/17470210902846757
- Kuhrer, M., Hupperich, T., Rossow, C., & Holz, T.** (2014). Hell of a Handshake: Abusing TCP for Reflective Amplification DDoS Attacks. Paper presented at the 8th USENIX Workshop on Offensive Technologies, San Diego, CA.
- Lamere, P.** (2009). Inside the precision hack. Retrieved 22/11/2016 from <https://musicmachinery.com/2009/04/15/inside-the-precision-hack/>
- Lamont, P., & Wiseman, R.** (2005). *Magic in Theory*. Hertfordshire: University of Hertfordshire Press.
- Langer, E., Djikic, M., Pirson, M., Madenci, A., & Donohue, R.** (2010). Believing is seeing: using mindlessness (mindfully) to improve visual acuity. *Psychol Sci*, 21(5), 661-666. doi: 10.1177/0956797610366543
- Leal, S., Vrij, A., Nahari, G., & Mann, S.** (2016). Please be Honest and Provide Evidence: Deterrents of Deception in an Online Insurance Fraud Context. *Applied Cognitive Psychology*, 30(5), 768-774. doi: 10.1002/acp.3252
- Lee, C. W.** (2010). The Roots of Astroturfing. *Contexts*, 9(1), 73-75. doi: 10.1525/ctx.2010.9.1.73.
- Lee, K., & Ross, H. J.** (1997). The concept of lying in adolescents and young adults: Testing Sweetser's folkloristic model. *Merrill-Palmer Quarterly* (1982-), 255-270.
- Lerner, J. S., & Keltner, D.** (2001). Fear, anger, and risk. *J Pers Soc Psychol*, 81(1), 146-159.
- Lerner, J. S., & Tiedens, L. Z.** (2006). Portrait of the angry decision maker: How appraisal tendencies shape anger's influence on cognition. *Journal of Behavioral Decision Making (Special Issue on Emotion and Decision Making)*, 19, 115-137.
- Lev-Yadun, S.** (2014). Müllerian mimicry in aposematic spiny plants. *Plant Signaling & Behavior*, 4(6), 482-483. doi: 10.4161/psb.4.6.8848
- Lev-Yadun, S.** (2016). Additional Cases of Defensive Visual Batesian Mimicry Among Plants Defensive (anti-herbivory) Coloration in Land Plants (pp. 173-174). Cham: Springer International Publishing.
- Lev-Yadun, S.** (2014). Defensive masquerade by plants. *Biological Journal of the Linnean Society*, 113(4), 1162-1166.
- Limb, C. J., & Braun, A. R.** (2008). Neural substrates of spontaneous musical performance: an fMRI study of jazz improvisation. *PLoS ONE*, 3(2), e1679. doi: 10.1371/journal.pone.0001679
- Livingston, B.** (2005). 'Googlewashing' Makes Your Site Invisible. Retrieved 22/11/2016 from http://www.datamation.com/columns/executive_tech/print.php/3560691
- Long, J.** (2008). *No Tech Hacking – A Guide to Social Engineering, Dumpster Diving, and Shoulder Surfing*. Rockland, MA: Syngress Publishing.
- Lotto, B.** (2017). *Deviate: the science of seeing differently* (1st edition. ed.). New York, NY: Hachette Books.
- Lovell, S.** (1996). *How to Cheat at Everything: A Con Man Reveals the Secrets of the Esoteric Trade of Cheating, Scams, and Hustles*. Philadelphia PA: Running Press Book Publishers.
- Macknik, S., Martinez-Conde, S., & Blakeslee, S.** (2011). *Sleights of Mind: What the neuroscience of magic reveals about our everyday deceptions*. London: Profile Books.
- Macknik, S. L., & Martinez-Conde, S.** (2004). Temporal Factors. In S. Liversedge, I. Gilchrist, & S. Everling (Eds.), *Oxford Handbook of Eye Movements* (pp. 1060-1062). Oxford: Oxford University Press.
- Mallet, J.** (1995). Why are there so many mimicry rings? Correlations between habitat, behaviour and mimicry in *Heliconius* butterflies. *Biological Journal of the Linnean Society*(55), 159-180.
- Mallet, J., McMillan, W. O., & Jiggins, C. D.** (1998). Mimicry and Warning Color at the Boundary between Races and Species. In D. J. Howard & S. H. Berlocher (Eds.), *Endless Forms, Species and Specialisations* (pp. 390-403). Oxford: Oxford University Press.

- Malt, B. C.** (1995). Category coherence in cross-cultural perspective. *Cognitive psychology*, 29(2), 85-148.
- Mant, J., Peakall, R., & Schiestl, F. P.** (2005). Does selection on floral odor promote differentiation among populations and species of the sexually deceptive orchid genus *Ophrys*? *Evolution*, 59(7), 1449-1463.
- Marcus, R.** (2005). *The great casino heist*. London: Robinson.
- Maskeylne, N., & Devant, D.** (1911). *Our magic: the art in magic, the theory of magic, the practice of magic*. New York: E.P. Dutton & Co.
- Matusikova, I., Salaj, J., Moravcikova, J., Mlynarova, L., Nap, J. P., & Libantova, J.** (2005). Tentacles of in vitro-grown round-leaf sundew (*Drosera rotundifolia* L.) show induction of chitinase activity upon mimicking the presence of prey. *Planta*, 222(6), 1020-1027. doi: 10.1007/s00425-005-0047-5
- Maxim, D., Mathtech Inc., & Everest Consulting Associates Inc.** (1982). *Deception failures, non-failures and why*. Washington: Office of Research and Development (Deception Research Program), Central Intelligence Agency.
- Maxim, D. L.** (1980). *Deception Maxims: Fact And Folklore*. Washington DC: Everest Consulting Associates Inc., Mathtech Inc.
- McGovern, R.** (2017). Another Hatchet Job on Snowden. Retrieved 18/03/2018 from <https://consortiumnews.com/2017/03/03/another-hatchet-job-on-snowden/>
- Meyer, K. M., Soldaat, L. L., Auge, H., & Thulke, H. H.** (2014). Adaptive and selective seed abortion reveals complex conditional decision making in plants. *Am Nat*, 183(3), 376-383. doi: 10.1086/675063
- Millen, A. E., Hope, L., Hillstrom, A. P., & Vrij, A.** (2016). Tracking the truth: the effect of face familiarity on eye fixations during deception. *Q J Exp Psychol (Hove)*, 1-14. doi: 10.1080/17470218.2016.1172093
- Mills, C. A., & Mills, A. L.** (2008). *Alexandria, 1861-1865*. Mt. Pleasant, SC: Arcadia Publishing.
- Mitnick, K., & Simon, W. L.** (2002). *The Art of Deception: Controlling the Human Element of Security*. Indianapolis, Indiana: Wiley Publishing Inc.
- Moltke, H., Graf von.** (1892). *Militarische Werke (vol. 2, part 2)*. Berlin: Ernst Sigfried Mittler & Son.
- Moore, P. A.** (2015). *The Hidden Power of Smell: How Chemicals Influence Our Lives and Behavior*. New York: Springer International Publishing.
- Morris, S. P.** (2013). Deception in Sports. *Journal of the Philosophy of Sport*, 41(2), 177-191. doi: 10.1080/00948705.2013.785419
- Nahai, N.** (2012). *Webs of influence: the psychology of online persuasion*. Harlow: Pearson Business.
- National Research Council Committee to Review the Scientific Evidence on the Polygraph.** (2003). *The Polygraph and Lie Detection*. Washington, D.C.: National Academies Press.
- Newhagen, J. E., & Rafaeli, S.** (1996). Why communication researchers should study the Internet: A dialogue. *Journal of computer-mediated communication*, 1(4), JCMC145.
- Nguyen, A., Yosinski, J., & Clune, J.** (2015). Deep neural networks are easily fooled: High confidence predictions for unrecognizable images. Paper presented at the Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition.
- Nisbett, R.** (2004). *The geography of thought: How Asians and Westerners think differently... and why*. New York: Simon and Schuster.
- Orlowski, A.** (2003). Anti-war slogan coined, repurposed and Googlewashed ... in 42 days. Retrieved 22/11/2016 from http://www.theregister.co.uk/2003/04/03/antiwar_slogan_coined_repurposed/
- Ortiz, D.** (1984). *Gambling scams : how they work, how to detect them, how to protect yourself*. New York: Dodd, Mead.
- Oxford English Dictionary.** (2016). Definition of 'deception'. Oxford: Oxford University Press.
- Palomäki, J., Yan, J., & Laakasuo, M.** (2016). Machiavelli as a poker mate — A naturalistic behavioural study on strategic deception. *Personality and Individual Differences*, 98, 266-271. doi: 10.1016/j.paid.2016.03.089
- Paulus, H. F.** (2006). Deceived males—pollination biology of the Mediterranean orchid genus *Ophrys* (Orchidaceae). *Journal Europäischer Orchideen*, 38(2), 303-353.
- Pfleegor, A. G., & Roesenberg, D.** (2013). Deception in Sport: A New Taxonomy of Intra-Lusory Guiles. *Journal of the Philosophy of Sport*, 41(2), 209-231. doi: 10.1080/00948705.2013.785424
- Pinker, S.** (2003). Language as an adaptation to the cognitive niche. In M. Christiansen & S. Kirb (Eds.), *Language Evolution: States of the Art*. New York: Oxford University Press.
- Plassmann, H., O'Doherty, J., Shiv, B., & Rangel, A.** (2008). Marketing actions can modulate neural representations of experienced pleasantness. *Proceedings of the National Academy of Sciences*, 105(3), 1050-1054. doi: 10.1073/pnas.0706929105
- Raghunathan, R., & Pham, M. T.** (1999). All Negative Moods Are Not Equal: Motivational Influences of Anxiety and Sadness on Decision Making. *Organ Behav Hum Decis Process*, 79(1), 56-77. doi: 10.1006/obhd.1999.2838
- Reeves-Evison, T.** (2016). Deception and Fiction as Forms of World-making in Contemporary Art. *Paragrana*, 25(2), 135-143. doi: 10.1515/para-2016-0034
- Reid, C. R., Garnier, S., Beekman, M., & Latty, T.** (2015). Information integration and multiattribute decision making in non-neuronal organisms. *Animal Behaviour*, 100, 44-50. doi: 10.1016/j.anbehav.2014.11.010

- Reid, C. R., MacDonald, H., Mann, R. P., Marshall, J. A., Latty, T., & Garnier, S.** (2016). Decision-making without a brain: how an amoeboid organism solves the two-armed bandit. *J R Soc Interface*, 13(119). doi: 10.1098/rsif.2016.0030
- Rittel, H. W., & Webber, M. M.** (1973). Dilemmas in a general theory of planning. *Policy sciences*, 4(2), 155-169.
- Robert-Houdin, J.-E. (1860). *Memoirs of Robert-Houdin: Ambassador, Author, and Conjuror*. London: Chapman and Hall.
- Robert-Houdin, J. E.** (1878). *Comment on devient sorcier: les secrets de la prestidigitacion et de la magie*. Paris: Calmann Lévy.
- Roe, K.** (2017). *Leadership: Practice and Perspectives*. Oxford: Oxford University Press.
- Rowe, N. C., & Rrushi, J.** (2016). *Introduction to Cyberdeception*. Switzerland: Springer International Publishing.
- Rowland, I.** (2008). *The Full Facts Book of Cold Reading: A Comprehensive Guide to the Most Persuasive Psychological Manipulation Technique in the World and Its Application to Psychic Readings*: Ian Rowland, Limited.
- RTO Task Group SCI-131/RTG-028.** (2008). *Military Impact of Future Denial and Deception*. (RTO Technical Report TR-SCI-131). NATO.
- Sanders, J. G., Ueda, Y., Minemoto, K., Noyes, E., Yoshikawa, S., & Jenkins, R.** (2017). Hyper-realistic face masks: a new challenge in person identification. *Cogn Res Princ Implic*, 2(1), 43. doi: 10.1186/s41235-017-0079-y
- Schaefer, H. M., & Ruxton, G. D.** (2009). Deception in plants: mimicry or perceptual exploitation? *Trends Ecol Evol*, 24(12), 676-685. doi: 10.1016/j.tree.2009.06.006
- Schaffner, J. H.** (1910). Leaf Markings of Certain Ohio Plants. *The Ohio Naturalist*, 11(2), 234-245.
- Scherer, K. R.** (2003). Introduction: Cognitive components of emotion. In R. J. Davidson, K. R. Scherer, & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 563–571). New York: Oxford University Press.
- Schiestl, F. P., Peakall, R., Mant, J. G., Ibarra, F., Schulz, C., Franke, S., & Francke, W.** (2003). The chemistry of sexual deception in an orchid-wasp pollination system. *Science*, 302(5644), 437-438. doi: 10.1126/science.1087835
- Schiestl, F. P., & Schluter, P. M.** (2009). Floral isolation, specialized pollination, and pollinator behavior in orchids. *Annu Rev Entomol*, 54, 425-446. doi: 10.1146/annurev.ento.54.110807.090603
- Scopece, G., Musacchio, A., Widmer, A., & Cozzolino, S.** (2007). Patterns of reproductive isolation in Mediterranean deceptive orchids. *Evolution*, 61(11), 2623-2642. doi: 10.1111/j.1558-5646.2007.00231.x
- Sekaran, U.** (2003). *Research Methods for Business*. New York, New York: John Wiley & Sons.
- Sharif, M., Bhagavatula, S., Bauer, L., & Reiter, M. K.** (2016). Accessorize to a crime: Real and stealthy attacks on state-of-the-art face recognition. Paper presented at the Proceedings of the 2016 ACM SIGSAC Conference on Computer and Communications Security.
- Shepard, R. N.** (1964). Circularity in judgments of relative pitch. *Journal of the Acoustical Society of America*, 36(12), 2346–2353.
- ShIPLEY, J. T.** (1953). *Dictionary of World Literature: Criticism, Forms, Technique*. New York: Philosophical Library.
- Shrum, L. J., Liu, M., Nespoli, M., & Lowrey, T. M.** (2012). Persuasion in the Marketplace: How Theories of Persuasion Apply to Marketing and Advertising. In J. Dillard & L. Shen (Eds.), *The Persuasion Handbook*. Thousand Oaks, CA: Sage.
- Sinclair, A.** (1996). Young Children's Practical Deceptions And Their Understanding Of False Belief. *New Ideas in Psychology*, 14(2), 157-173.
- Solorio, T., Hasan, R., & Mizan, M.** (2013). A Case Study of Sockpuppet Detection in Wikipedia. Paper presented at the Workshop on Language in Social Media (LASM 2013), June 13 2013, Atlanta, Georgia.
- Soltau, U., Dötterl, S., & Liede-Schumann, S.** (2009). Leaf variegation in *Caladium stedneriifolium* (Araceae): a case of mimicry? *Evolutionary ecology*, 23(4), 503-512.
- Soviet Deception in The Cuban Misile Crisis.
- Spence, S. A., Hunter, M. D., Farrow, T. F., Green, R. D., Leung, D. H., Hughes, C. J., & Ganesan, V.** (2004). A cognitive neurobiological account of deception: evidence from functional neuroimaging. *Philos Trans R Soc Lond B Biol Sci*, 359(1451), 1755-1762. doi: 10.1098/rstb.2004.1555
- Staff, U. J. C. o.** (2007). US Joint Publication JP 1-02, US Department of Defense Dictionary of Military and Associated Terms. US Department of Defense.
- Stajano, F., & Wilson, P.** (2009). *Understanding Scam Victims: Seven Principles for Systems Security* (pp. 22): University of Cambridge Computer Laboratory.
- Stech, F., & Elsaesser, C.** (2004). Midway revisited: Detecting Deception by Analysis of Competing Hypothesis. Paper presented at the 72nd Military Operational Research Symposium (MORS), Monterey, CA.
- Stevens, M.** (2007). Predator perception and the interrelation between different forms of protective coloration. *Proc Biol Sci*, 274(1617), 1457-1464. doi: 10.1098/rspb.2007.0220
- Stökl, J., Schlüter, P. M., Stuessy, T. F., Paulus, H. F., Fraberger, R., Erdmann, D., . . . Ayasse, M.** (2009). Speciation in sexually deceptive orchids: pollinator-driven selection maintains discrete odour phenotypes in hybridizing species. *Biological Journal of the Linnean Society*, 98(2), 439-451. doi: 10.1111/j.1095-8312.2009.01279.x

- Streiner, M., Ellis, T., Paulus, H. F., & Spaethe, J.** (2010). Visual discrimination between two sexually deceptive *Ophrys* species by a bee pollinator. *Arthropod Plant Interact*, 4(3), 141-148. doi: 10.1007/s11829-010-9093-4
- Streiner, M., Paulus, H. F., & Spaethe, J.** (2009). Floral colour signal increases short-range detectability of a sexually deceptive orchid to its bee pollinator. *J Exp Biol*, 212(Pt 9), 1365-1370. doi: 10.1242/jeb.027482
- Syrus, P.** (85-43BC). *Sententiae* (E. Wölfflin, Trans.).
- Szpunar, K. K., & McDermott, K. B.** (2008). Episodic future thought and its relation to remembering: evidence from ratings of subjective experience. *Conscious Cogn*, 17(1), 330-334. doi: 10.1016/j.concog.2007.04.006
- Tangen, J. M., Murphy, S. C., & Thompson, M. B.** (2011). Flashed face distortion effect: Grotesque faces from relative spaces. *Perception*, 40(5), 628-630. doi: 10.1068/p6968
- The Telegraph.** (2016). Chemicals dealer 'sold more benzocaine to cocaine gang than GlaxoSmithKlein uses in a year'. Retrieved 22/11/2016 from <http://www.telegraph.co.uk/news/uknews/law-and-order/12171829/Chemicals-dealer-sold-more-benzocaine-to-cocaine-gang-than-GlaxoSmithKlein-uses-in-a-year.html>
- Theerasilp, S., & Kurihara, Y.** (1988). Complete purification and characterization of the taste-modifying protein, miraculin, from miracle fruit. *J Biol Chem*, 263(23), 11536-11539.
- Thunberg, T.** (1896). Förnimmelserne vid till samma ställe lokaliserad, samtidigt pågående köld-och värmeretning. [Förnimmelserne at the same place localized, simultaneous cold and heat stimuli]. *Uppsala Läkfören*, 1, 489-495.
- Tieman, D. M., Zeigler, M., Schmelz, E. A., Taylor, M. G., Bliss, P., Kirst, M., & Klee, H. J.** (2006). Identification of loci affecting flavour volatile emissions in tomato fruits. *J Exp Bot*, 57(4), 887-896. doi: 10.1093/jxb/erj074
- Torres, P.** (2012). New Species of 'Decoy' Spider Likely Discovered At Tambopata Research Center. Retrieved from <http://blog.perunature.com/new-species-of-decoy-spider-likely-discovered-at-tambopata-research-center.html>
- Trewavas, A.** (2002). Mindless mastery. *Nature*, 415(6874), 841. doi: 10.1038/415841a
- Tsvetkova, M., Garcia-Gavilanes, R., Floridi, L., & Yasseri, T.** (2017). Even good bots fight: The case of Wikipedia. *PLoS ONE*, 12(2), e0171774. doi: 10.1371/journal.pone.0171774
- Tyler, J. M., Feldman, R. S., & Reichert, A.** (2006). The price of deceptive behavior: Disliking and lying to people who lie to us. *Journal of Experimental Social Psychology*, 42(1), 69-77. doi: 10.1016/j.jesp.2005.02.003
- Tzu, S.** (500 B.C.). *The Art of War*.
- University of Cambridge.** (2015). Conference Programme for: Decepticon International Conference on Deceptive Behavior. University of Cambridge. Retrieved 16/11/2016 from <https://www.cl.cam.ac.uk/events/decepticon2015>
- Vereecken, N. J.** (2009). Deceptive Behavior in Plants. I. Pollination by Sexual Deception in Orchids: A Host-Parasite Perspective. 203-222. doi: 10.1007/978-3-540-89230-4_11
- Vereecken, N. J., & McNeil, J. N.** (2010). Cheaters and liars: chemical mimicry at its finest. *Canadian Journal of Zoology*, 88(7), 725-752. doi: 10.1139/z10-040
- Wada, Y., Masuda, T., & Noguchi, K.** (2005). Temporal illusion called 'kappa effect' in event perception. *Perception*, 34(ECVP Abstract Supplement).
- Weick, K. E., & Sutcliffe, K. M.** (2007). *Managing the unexpected : resilient performance in an age of uncertainty* (2nd ed.). San Francisco: Jossey-Bass.
- Whaley, B.** (2006a). Interdisciplinary Musings on the History of Counterdeception. *Defense Intelligence Journal*, 15(2), 31-50.
- Whaley, B.** (2006b). *Orson Welles: The Man Who Was Magic*: Lybrary.
- Whaley, B.** (2007). *Stratagem: Deception And Surprise In War*. Boston: Artech House.
- Whaley, B.** (2010a). *Practise to Deceive: Learning Curves of Military Deception Planners*. Washington, DC: Foreign Denial & Deception Committee, National Intelligence Center, Office of the Director of National Security.
- Whaley, B.** (2010b). *When Deception Fails: The Theory Of Outs*. Washington, DC: Foreign Denial & Deception Committee, National Intelligence Center, Office of the Director of National Security.
- Whaley, B.** (2016). *Turnabout and deception: crafting the double-cross and the theory of outs*. Annapolis, Maryland: Naval Institute Press.
- Whaley, B., & Busby, J.** (2000). Detecting Deception: Practice, Practitioners and Theory. *Trends in Organised Crime*, 6(1), 73-105.
- Williams, K. S., & Gilbert, L. E.** (1981). Insects as selective agents on plant vegetative morphology: egg mimicry reduces egg laying by butterflies. *Science*, 212(4493), 467-469.
- Xenophon.** (350 B.C.). *On the Cavalry Commander* (E. C. Marchant & G. W. Bowersock, Trans.). Cambridge, MA: Harvard University Press.
- Xie, Z., Ulrich, L. E., Zhulin, I. B., & Alexandre, G.** (2010). PAS domain containing chemoreceptor couples dynamic changes in metabolism with chemotaxis. *Proc Natl Acad Sci U S A*, 107(5), 2235-2240. doi: 10.1073/pnas.0910055107
- Yan, Y., Borrego, E., & Kolomiets, M. V.** (2013). Jasmonate Biosynthesis, Perception and Function in Plant Development and Stress Responses. doi: 10.5772/52675
- Zibreg, C.** (2013). Samsung fined \$340,000 over faking negative web comments about competition. Retrieved 22/11/2016 from <http://www.idownloadblog.com/2013/10/24/samsung-fined-over-faked-web-comments/>

Acknowledgements

The author would like to express his sincere thanks to the following individuals who have all contributed to, informed, shaped, influenced or otherwise impacted upon the ideas presented in this handbook: Darren Lawrence, Rob Black, Barton Whaley, George Brander, Ben Earl, Robert Hoffman, Gary Klein, Pat Allen, Raph Pascual, Claire Outteridge, Jon Jenkins, Jenni Henderson and the various project sponsors & practitioners it has been an honour, pleasure, and (on occasion) a thrill to work with.



artifice

www.artifice.co.uk